PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark Office, PCT
2011 South Clark Place Room CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing: 01 February 2001 (01.02.01)	
International application No.: PCT/EP00/07249	Applicant's or agent's file reference: 23258P WO
International filing date: 27 July 2000 (27.07.00)	Priority date: 27 July 1999 (27.07.99)
Applicant: BANG, Young, Chul	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International preliminary Examining Authority on:

22 December 2000 (22.12.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer:

J. Zahra

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

14

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
23258P WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP00/07249	27/07/2000	27/07/1999
International Patent Classification (IPC) or national classification and IPC A61M5/32		
Applicant MEDI PLUS TEC MEDIZINISCH- TECHNISCHE...		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☒ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
22/12/2000	09.11.2001
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Schönleben, J Telephone No. +31 70 340 2436

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/07249

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-17 as originally filed

Claims, No.:

1-12 as received on 25/09/2001 with letter of 25/09/2001

Drawings, sheets:

1/11-11/11 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)
see separate sheet

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:
see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☒ all parts.

☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims 1-12
	No:	Claims
Inventive step (IS)	Yes:	Claims
	No:	Claims 1-12

Industrial applicability (IA)	Yes:	Claims 1-12
	No:	Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item I

Basis of the report

The amendments filed with the International Bureau under Article 19(1) introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 19(2) PCT. The amendments concerned are the following:
In claims 5 and 6 the grooves are specified as being *substantially* L-shaped by *substantially* extending in an axial direction and *substantially* extending in a circumferential direction. This is in contradiction to the original description, which discloses only a real L-shaped configuration (see e.g. page 5, line 5, of the amended version).

Re Item IV

Lack of unity of invention

Claims 1 to 5 are related to a safety syringe comprising a needle holder fixed to the syringe cylinder by a groove-projection-arrangement having axially extending grooves with a wide groove entrance.

Claims 6 to 12 are related to a safety syringe comprising a needle holder fixed to the syringe cylinder by a groove-projection-arrangement having axially and circumferentially extending grooves formed in an L-shape on the outer surface of the needle holder.

The features common to independent claims 1 and 6 are known from prior art document EP-A-278493 (see Item V, below). These common features are therefore no special technical features within the meaning of Rule 13.2 PCT.

Since the remaining structural features (claim 1: the grooves have a wide tapered entrance in order to facilitate the coupling of the needle holder with the syringe cylinder; claim 6: the grooves are formed on the outer surface of the needle holder in an L-shape in order to allow a safe fixation of the needle holder in the front region of the syringe cylinder) are not the same or corresponding technical features, no relationship exits between the groups of claims as defined above. Without such a relationship the groups are not so linked as to form a common inventive concept (Rule 13.1 PCT).

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Document EP-A-278493 discloses (see especially fig. 1 to 3 and 8 to 9 and the corresponding description) a safety syringe having a cylinder 60, a syringe needle 2, a needle holder 6 associated to the cylinder and adapted to hold the syringe needle, and a plunger 40 associated to the cylinder, wherein the plunger comprises a piston 20 and serves to inject a filling of the cylinder via the syringe needle, wherein the plunger can be coupled with the needle holder arranged in the region of the front hole 66 of the cylinder, to retract the needle holder together with the syringe needle into the cylinder by pulling the plunger, and wherein the needle holder is fixed or fixable in the region of the front hole 66 to the cylinder by a groove-projection-arrangement 14, 68 having axially extending grooves 68 with entrances for receiving a respective projection 14 so that the projections 14, after having passed the entrances and the axially extending grooves 68, can be rotated with respect to the axially extending grooves (see col. 8, line 43, to col. 9, line 7), to axially fix the needle holder in the region of the front hole against retraction into the cylinder.

The subject-matter of claim 1 differs from this state of the art only in that the entrances of the grooves are formed as wide tapered groove entrances (see also fig. 13 and 19).

The subject-matter of claim 6 differs from this state of the art only in that the grooves are located on the outer surface of the needle holder and formed as L-shaped grooves.

The problems to be solved by these differing features can be defined as follows: For claim 1: To provide a safety syringe facilitating the coupling of the needle holder with the syringe cylinder; and for claim 6: To provide a safety syringe allowing a safe fixation of the needle holder in the front region of the syringe cylinder.

No positive contribution to inventive step can be seen in formulating these particular problems because they are common and general problems which a skilled person would seek to solve.

Moreover, the differing features are well known for the use of bayonet engagements. Consequently, the skilled person would regard it a normal design procedure to combine

all the features set out in claims 1 and 6 in order to solve the problems posed. Thus, the subject-matters of claims 1 and 6 do not involve an inventive step and do not satisfy the criterion set forth in Article 33(3) PCT.

Dependent claims 2 to 5 and 7 to 12 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step. See for example:

EP-A-278493, col. 8, line 43, to col. 9, line 16; col. 10, lines 6 to 28; and fig. 3, 4 and 15 to 17; for claims 2, 3, 7 to 12.
Claims 4 and 5 specify only slight constructional changes of the bayonet connection (see also the objection made to claim 6 above) which come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen.

Re Item VII

Certain defects in the international application

Independent claims 1 and 6 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document EP-A-278493, see also item V above) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

The description has not be brought into conformity with the claims as required by Rule 5.1(a)(iii) PCT and the relevant background art disclosed in EP-A-278493 has not been mentioned and identified in the description.

Re Item VIII

Certain observations on the international application

The features in the apparatus claim 2, 3, 7, 8 and 11 relate to a method of using the apparatus rather than clearly defining the apparatus in terms of its technical features. The intended limitations are therefore not clear from this claim, contrary to the requirements of Article 6 PCT.

Replaced by art. 34 Amendment

27. Juli 2000

CLAIMS

1. Safety syringe, having a cylinder (11; 11), a syringe needle (21; 21), a needle holder (31; 31) associated to the cylinder and adapted to hold the syringe needle, and a plunger (41; 41) associated to the cylinder (11; 11), wherein the plunger (41; 41) comprises a piston (42; 42) and serves to inject a filling of the cylinder (11; 11) via the syringe needle (21; 21), and wherein the plunger (41; 41) can be coupled with the needle holder (31; 31) arranged in the region of a front hole (12; 12)) of the cylinder (11; 11), to retract the needle holder (31; 31) together with syringe needle (21; 21) into the cylinder (11; 11) by pulling the plunger (41; 41).

2. Syringe according to claim 1, characterized in that the plunger (41; 41) has a predeterminded breaking point, to allow, that a re-use of the syringe can be inhibited by breaking the plunger (41; 41).

3. Syringe according to claim 1 or 2, characterized in that the plunger (41; 41) carries a cap (49), which can be inserted in the front hole (12) of the cylinder (11) after retraction of the syringe needle (21) into the cylinder (11).

4. Syringe according to claim 2, characterized in that after breaking the plunger (41) a part of the plunger (41) can be inserted in the front hole (12) of the cylinder (11) after retraction of the syringe needle (21) into the cylinder (11).

5. Syringe according to one of the preceeding claims, characterized in that the plunger (41; 41) and the needle holder (21; 21) can be coupled by a snap-in connection (43, 43´, 37; 43, 43´, 37).

6. Syringe according to one of the preceeding claims, characterized in that the needle holder (21; 21) is fixed or fixable in the region of the front hole (12; 12) to the cylinder (11; 11) by a groove-projection-arrangement (13, 34; 13, 34).

7. Syringe according to claim 6, characterized in that the groove-projection-arrangement (13, 34; 13, 34) is arranged such, that the needle holder (21; 21), which is fixed in the region of the front hole (12; 12) to the cylinder (11; 11), can be released for retraction into the cylinder (11; 11) by rotating the needle holder (21; 21) with respect to the cylinder (11; 11).

8. Syringe according to claim 7, characterized in that the coupling between the plunger (41; 41) and the needle holder (21; 21) is adapted, to effect a rotation of the needle holder (21; 21) with respect to the cylinder (11; 11) by rotating the plunger (41; 41) which is coupled with the needle holder (21; 21), with respect to the cylinder (11, 11).

9. Syringe according to one of the preceeding claims, characterized by at least one feature disclosed within the specification or/and the drawings.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
23258P WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP 00/ 07249	27/07/2000	27/07/1999
Applicant		
MEDI PLUS TEC MEDIZINISCH- TECHNISCHE...		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 11

   [ ] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [X] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/07249

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61M5/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 618 075 A (ASSISTANCE PUBLIQUE ;CONSERVATOIRE NAL ARTS METIERS (FR)) 20 January 1989 (1989-01-20) figures 6-9 ---	1-9
X	EP 0 824 924 A (CHEN LONG HSIUNG) 25 February 1998 (1998-02-25) the whole document ---	1,2,4-6, 9
X	EP 0 278 493 A (HABLEY MEDICAL TECHNOLOGY CORP) 17 August 1988 (1988-08-17) the whole document ---	1,2,4-9
X	US 5 205 824 A (MAZUR MATTHEW S) 27 April 1993 (1993-04-27) the whole document ---	1,2,4-9

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 December 2000	11/12/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Clarkson, P

1

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 256 151 A (CHUL BANG Y) 26 October 1993 (1993-10-26) cited in the application the whole document -----	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 00/07249

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2618075 A	20-01-1989	WO 8900432 A	26-01-1989
EP 0824924 A	25-02-1998	NONE	
EP 0278493 A	17-08-1988	US 4710170 A	01-12-1987
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		AU 2239592 A	12-01-1993
		BR 9206138 A	12-09-1995
		CA 2111208 A	23-12-1992
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		KR 245533 B	15-02-2000
		WO 9222339 A	23-12-1992
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		JP 3097468 A	23-04-1991
		JP 6049071 B	29-06-1994
		NO 176005 B	10-10-1994
		PT 94379 A	08-02-1991

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 February 2001 (01.02.2001)

PCT

(10) International Publication Number
WO 01/07106 A1

(51) International Patent Classification[7]: A61M 5/32

(21) International Application Number: PCT/EP00/07249

(22) International Filing Date: 27 July 2000 (27.07.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
1999/15132 27 July 1999 (27.07.1999) KR

(71) Applicant *(for all designated States except US)*: **MEDI PLUS TEC MEDIZINISCH-TECHNISCHE HANDELSGESEL LSCHAFT MBH** [DE/DE]; Baerler Strasse 100, D-47441 Moers (DE).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **BANG, Young, Chul** [KR/KR]; #202, Sunneung Villa Ka-Dong, 140-32, Samsung-Dong, Kangnam-Ku, Seoul (KR).

(74) Agents: **WEICKMANN, H.** et al.; Kopernikusstrasse 9, D-81679 München (DE).

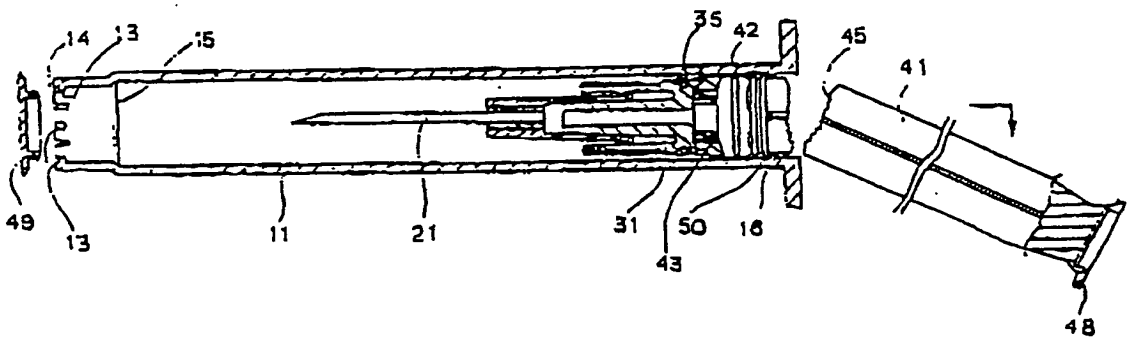
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*
— *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SAFETY SYRINGE



(57) Abstract: The invention provides a safety syringe, which has a cylinder (11), a syringe needle (21), a needle holder (31) associated to the cylinder and adapted to hold the syringe needle, and a plunger (41) associated to the cylinder (11), wherein the plunger (41) comprises a piston (42) and serves to inject a filling of the cylinder (11) via the syringe needle (21), and wherein the plunger (41) can be coupled with the needle holder (31) arranged in the region of a front hole (12) of the cylinder (11), to retract the needle holder (31) together with syringe needle (21) into the cylinder (11) by pulling the plunger (41).

WO 01/07106 A1

SAFETY SYRINGE

This invention relates to a safety syringe, which has a cylinder, a syringe needle, a needle holder associated to the cylinder and adapted to hold the syringe needle, and a plungerassociated to the cylinder, wherein the plunger comprises a piston and serves to inject a filling of the cylinder via the syringe needle.

The invention provides a syringe having the features of claim 1. For particular high safety, the features of claim 2 are suggested. Advantages with respect to the safefty are also obtained for the features of claim 3 or - alternatively - of claim 4. Substantial advantages are further obtained from the features of at least one of claims 5 to 8, which concern the coupling of the plunger with the needle holder and the fixation of the needle holter to the cylinder in the region of a front hole of the cylinder. Other possible features of a syringe according to the invention, which give further advantages, can be found in the following specification or/and in the figures.

A first embodiment, which serves to illustrate a syringe according to a first aspect of the invention, is shown in figures 1 to 11. The figures show:

Fig. 1; Cross-sectional view of the parts.
Fig. 2; Squint view of the parts.
Fig. 3; Lateral view of the cylinder.
Fig. 4; Lateral view of the syringe needle inserter.
Fig. 5; Front view of the syringe needle inseter.
Fig. 6; A-A line cross-sectional view of the Fig. 5.
Fig. 7; B-B line cross-sectional view of the Fig. 5.
Fig. 8; Front view of the plunger.
Fig. 9; Cross-sectional view of this device when injection is completed.
Fig.10; Cross-sectional view of the device when plunger meets the syringe needle fixer upon completion of injection.
Fig.11; Cross-sectional view of this device which shows the breaking of the plunger after pulling the plunger back into the cylinder in order to keep t the syringe needle an the syringe needle fixer inside the cylinder.

A second embodiment, which serves to illustrate a syringe according to a second aspect of the invention, is shown in figures 12 to 25. The figures show:

FIGURE 12 -A PARTIAL LONGITUDINAL CROSS-SECTION OF THE SYRINGE

FIGURE 13 -AN ISOMETRIC EXPLODED VIEW OF A NEEDLE INSERTING DEVICE

FIGURE 14 -A VIEW OF THE PLUNGER

FIGURE 15 -A LONGITUDINAL CROSS-SECTION OF THE SYRINGE WITHOUT NEEDLE

FIGURE 16 -A LONGITUDINAL CROSS-SECTION OF THE SYRINGE WITHOUT NEEDLE THAT THE PLUNGER IS ASSEMBLED WITH THE NEEDLE NEEDLE INSERTING DEVICE

FIGURE 17 -A PARTIAL CROSS-SECTION SHOWS BREAKING OFF THE PLUNGER AFTER INJECTION

FIGURE 18 -A LONGITUDINAL CROSS-SECTION OF THE SYRINGE COVERED WITH A PART SEPARATED FROM THE PLUNGER

FIGURE 19 -A LONGITUDINAL VIEW OF THE NEEDLE INSERTING DEVICE

FIGURE 20 -A A-A LINE CROSS-SECTION IN FIGURE 12

FIGURE 21 -A ANOTHER A-A LINE CROSS-SECTION IN FIGURE 12

FIGURE 22 -A B-B LINE CROSS-SECTION IN FIGURE 12

FIGURE 23 -A C-C LINE CROSS-SECTION IN FIGURE 19

FIGURE 24 -A E-E LINE CROSS-SECTION IN FIGURE 19

FIGURE 25 -A F-F LINE CROSS-SECTION IN FIGURE 19

The first embodiment and/or the second embodiment serve to illustrate further aspects of the invention.

In the following, a safety syringe according to the first aspect and further aspects of the invention is explained.

This device is for a safety syringe preventing a third person from getting damaged by the used syringe needles. It is designed to keep the syringe needle in custody of syringe cylinder once used so that a third person may not be pricked by the used needles. The plunger shall then be broken after use in order to prevent from being used again.

In order to prevent repeated use of syringe neeldes by far, it is the current phenomenon that disposable syringes are predominantly being used. Such conventional disposable syringes have been technically designed to prevent to be reused.

The conventional disposable syringes are, however, after being used, usually or frequently being disposed or not properly dealt with the needles and thus a third person may be sasily pricked. Such problems of giving damages to a third party have not been solved.

Because the syringe needles always have blood stain, in case medical workers including doctors and nurses as well as a third party get pricked by an used syringe needles they are very much concerned of being infected by the disease of the patients (AIDS, hepatitis, etc.) and such cases have been reported.

This device is a safety syringe system which prevents disease from being infected to a third party via used syringe needles by keeping it inside the syringe cylinder.

According to this device, the used needle does not need to be taken off from the syringe after use, but, instead, it is pulled into the cylinder to be fixed and kept in custody inside cylinder. And by doing this, infections of disease to a third party by getting pricked can be prevented.

My previous patent application of this nature regarding safety syringe system have been published on the Utility Model Announcement Korea Utility Model No.91-4532 and Open Utility Model Public News Korea Utility Model No.96-13409.

This device is to introduce more advanced safety syringe system which is simpler in structure and more reliable in affect compared with the above-said previous patent.

Technical Target that this device pursue to accomplish.

My previous safety syringe system published on the Utility Model Announcement No.91-4532 and Open Utility Model Public News No.96-13409 was to have the needleset fixed to the plunger so that the syringe needle can be kept inside cylinder when the plunger is pulled back.

The disposable syringe that I have patented as above had some defects requiring a host of parts and extreme preciseness whereby creating difficulties in manufacturing. This device has been developed instead. It is simpler in structure, easier in manufacturing, has eliminated the possibility of mis-use and requires less number of parts

In the following it is referred to Fig. 1 to 11.

Structure and action of the device.

It has cylinder for injection. Inside the cylinder are piston and plunger. In a syringe Which the dead-end of the cylinder has a syringe needle usually affixed, cylinder(11), syringe needle(21), syringe needle inserter(31) and plunger(41) are the parts in structure. At the end of inserting hole of the cylinder are a host of projection(13) and incised grooves arranged alternately. On the inner face of the cylinder are stopping sill(15) and obstacle (hooking?) sill at the rear end. At the center of the syringe needle inserter(31) is the syringe needle fixer(32). On the outer face(33) of barrel shaped syringe needle fixer(32) are number of "ㄱ" shaped grooves(34) for projections(13) to enter. Packing(35) is placed in its rear. Inside of the rear-end are projections prominence(36) on the top and bottom. Inside both of the up/down projections aforesaid is formed the obstacle(hooking) inside ring stopper(37). On the tip of the plunger(41) where piston(42) is inserted are top/bottom conecting device(43) which have hooking sills(43'). On the both sides of the central projection(44) are erected projctions(44'). At the end of the plunger(41) where piston(42) is inserted forms a space(47). Pressing button (48) at the rea part of the plunger(41) has a inserting groove(48'). The inserting groove(48') is for the cap(49) to be inserted to cover the inserting hole(12) of the cylinder tip.

In oredr for the plunger(41) to be easily broken, in the fore part of the plunger(41) are many "V" shaped grooves or holes and at the rear part of the piston(42) of plunger(41) is formed a stopping ring sill(50).

This device with such structure will act as follows:

Cylinder(11) and the syringe needle inserter(31) are combined together by thrusting the needle inserter(31) from the rear end of the cylinder (11) to the inside of the cylinder until the projections (13) on the inner face of the cylinder(11) insert hole(12) meet and set in the "¬" shaped grooves formed on the outer face of the barrel shaped needle inserter(31).

Then the piston(42) inserted plunger(41) is pushed into the rear side of the cylinder(11). Right before the use of the syringe, syringe needle(21) is fixed in the syringe needle inserter(31) as uasual. Injection is sucked into the cylinder(11) by pulling the plunger backward. Injection is done to the patient by pushing the plunger(41).

At the time when the syringe needle inserter(31) is fixed to the cylinder(11) from the rear toward inner side, it has to be pushed until the projections(13) of inserting hole(12) of the cylinder set in toward the circumference direction of the "¬" shaped grooves of the syringe needle inserter(31). At this time, the incised grooves between projections(13) will help syringe needle inserter(31) entering into the cylinder(11) by making the cylinder(11) tip bursted open so that the needle inserter(31) can be easily set in.

The stopping sill(15) of the inner face of the cylinder(11) joints the rear tip of the syringe needle inserter(31). The packing(35) inserted in the syringe needle inserter(31) will closely adhere to the inner face of the cylinder(11).

When the syringe inserter(31) is inserted by force into the inserting hole(12) of the cylinder(11) tip in order to fix the syringe needle inserter(31) onto the cylinder's(11) tip, the projections(13) of the inner face of the cyllinder(11) will be hooked on any of the "¬" shaped arooves (34) of the outer face of the syringe needle inseter(31), that is, on the groove of any location in circumference direction, but as the syringe needle inserter(31) turns accordingly when we trun and fix the syringe needle(21) in the syring needle inseter(31), the projections (13) erected in the inserting hole(12) of the cylinder(11) will become to locate at the last of the "¬" shaped grooves as soon as the syringe needle is fixed in.

Moreover, as the meeting places of the "ㄱ" shaped grooves are not flat but are "U" or "^" shaped, the projections(13) of cylinder(11) cannot be located on the border between the "ㄱ" shapes.

Like this, the syringe needle inserter (31) and syringe needle are fixed at the cylinder(11) tip, and by thrusting the plunge(41) into the cylinder(11), syringe assembly is completed. The syringe sucks the injection into the cylinder(11) when the plunger(41) is pulled back. After plucking the needle(21) from the patient(Ref. Fig.9) upon completion of injection, if we apply force to push the plunger(41) forward (Ref.Fig.10), piston(42) is being pressed so as for its volume to become smaller by the space (47) formed inside of the pistion (42), and at the same time, the respective hooking sills(43') of upper and lower connevting device(43) formed up and down the plunge(41) is inserted in the obstacle ring sill (37) of

the inner face of the rear part syringe needle inserter(31), plunger(41) tip and the syringe needle inserter(31) rear part will be combinde together. when the plunger(41) is turned, the projection (44') erected both sides of the central projection (44) of the plunger tip will joint the up/down projections(36) of the rear inner face of the syringe needle inserter(31). and the truning plunge(41) will trun the syringe needle inserter(31).

The syringe needle inserter (31) which is truned by the plunger (41) is again turning the "ㄱ" shaped grooves (34), then the projections(13) of the cylinder(11) will turn the straight line of the "ㄱ" shaped grooves(34). When the plunger is drawn back, the projections (13) will be pushed forward along the straight lines of "ㄱ" shaped grooves, and at the same time, the needle inserter(31) as well as the syringe needle(21) which is inserted thereto will be pushed back to inside of cylinder(11).

Backtracking plunger(41) will retreat until the plunger ring sill (40) reaches the hooking sill (16), then plunger (41) is to be broken. Then all the operation comes to and end by trans-inserting the cap(49) which is inserted in the pressing hole(48) into the inserting hole(12) in front of the cylinder(11).

In the cap's(49) inserting hold is prepared a ring(circular) sill and because the ring sill of the cap(49) insert hole is to meet the projection(13)of the insert hole(12) of cylinder(11), the cap inserted in the insert hole(12) would not easily come out.

Effect of this device.

This device is designed to withhold the used syringe needle inside the cylinder, the main body of syringe, and whereby to prevent the possible damages which may happen to medical workers including doctors and nurses as well as a third paty from being pricked by the used syringe needles.

The syringe needs to be dealt with utmost care regardless before of after use, due to the sharp-pointed needles. A special attention is required to be paid to the used ones because of the blood stain. Especially, because hepatitis and AIDS are infectious to a third party via blood stain, the syringes used ofr patients of such disease must be handled with special attention.

However, as described in this device, if we insert the used syringe needle into the cylinder and then break the plunger, the syringe needle will be located inside the cylinder. If we cover the cylinder with the cap prepared in the rear of the plunger, there is no possibility at all for the syringe needle inside the cylinder to be exposed out of the cylinder and can

be kept safely in custody until further process.
If we use this device, we cannot re-use the used syringes. Therefore, it is very useful device as it can prevent disease caused by the used syringe needles frome being infectious to a third person.

This device is designed to keep the used syringe needle inside the cylinder prohibiting re-use of the used syringe needles in order to prevent possible damages for medical workers including doctors and nurses and a third party alike to be taken from being pricked by the used syringe needles. The syringe needle which is fixed in the syringe needle fixer is set at the tip of cylinder with the help of the syringe needle inserter.

Inserting part is composed at the projection of the tip of the plunger which is to be put in the cylinder. At the rear end of the syringe needle fixer is formed the assembling part. The projection of the plunger joints the syringe needle fixer. When plunger is drawn back, syringe needle fixer with its needle fixed in will also be drawn back and kept inside the cylinder. Thus, damages by the used syringe needle can be prevented. This device is of the safety syringe which can prevent in infectious diseases such as hepatitis and AIDS.

Some important aspects of the safety syringe according to the first embodiment are as follows:

It has cylinder to suck in injection. Piston and plunger are in the cylinder while the ordinary syringe has the syringe needle affixed to the syringe, this device has the cylinder(11), syringe needle(21), syringe needle inserter(31) and plunger respectively as parts of its structure. At the insert hole(16) of the above said cylinder (11) tip are a host of projections(13) and incised grooves(14) arranged alternatively one after another.
Cylinder's(11) inner face has stopping sill and hooking sill in the rear. At the center of the syringe needle inserter is a syringe needle fixer to fix syringe needle. Outer barrel shaped outer face of the syringe needle fixer has a number of "ㄱ" shaped grooves for projections(13) formed on the inner face of the insert hole(12) to set in. packing(35) is set in the rear. On the upper and lower part of the inner face of the rear part are projections(36). Inside the upper and lower projections(16) is hooking ring sill(37). At the plunger(41) tip where piston is inserted in are top and bottom joints connecting device which has hooking sill(43'). On both sides of the central projection(44) inside the top/bottom joint connecting device. Space (47) is formed at the plnger(41) tip where piston is inserted in. At the pressing/pushing button(48) of the rear end of the plunger(41) has the insert groove(48'). In the insert groove(48'), a cap(49) is supposed to be inserted to cover insert hole(12) of the cylinder tip.

In the following, a safety syringe according to the second aspect and further aspects of the invention is explained.

THIS DEVICE RELATES TO A SAFETY SYRINGE SO AS TO PREVENT A PRICKING OF OTHER PERSON BY MEANS OF WITHDRAWING A NEEDLE IN THE INSIDE OF A BARREL KEEPING IN IT AFTER INJECTION AND THE REUSE OF A SYRINGE BY MEANS OF BREAKING OFF A PLUNGER.

THE PRIOR SINGLE USE SYRINGE WHICH A TECHNICAL METHOD IS APPLIED TO IN ORDER TO PREVENT THE REUSE OF A USED SYRINGE WAS USUAL.

BUT THERE WAS THE POSSIBILITY OF PRICKING BY A USED NEEDLE BECAUSE THE PRIOR SINGLE USE SYRINGE IS LEFT OR THROWN AWAY, HOLDING THE NEEDLE ON THE SYRINGE. THUS THE PROBLEM THAT OTHER PERSON MIGHT BE DAMAGED WITH THE USED NEEDLE COULDN'T BE SOLVED BY THE SINGLE USE SYRINGE.

THAT IS, SOME BLOOD IS LEFT ON THE NEEDLE AFTER INJECTION. IN THAT CASE, IF DOCTOR, NURSE, MEDICAL EMPLOYEE OR OTHER PERSON WAS PRICKED BY THE USED NEEDLE, THEY MIGHT BE INFECTED WITH THE DISEASE OF THE PATIENT(SUCH AS AIDS, HEPATITIS AND THE LIKE) BY IT. THE EXAMPLES ARE ACTUALLY REPORTED.

THIS DEVICE RELATES TO THE SAFETY SYRINGE SO AS TO PREVENT TRANSMITTING THE INFECTIOUS DISEASES THROUGH THE USED NEEDLE, WITHDRAWING THE USED NEEDLE INTO THE INSIDE OF A BARREL AND KEEPING IT IN A BARREL WITHOUT REMOVAL OF THE NEEDLE, AFTER INJECTION.

AS A PRIOR PATENT DOCUMENTS ON A SAFETY SYRINGE, THERE IS UTILITY MODEL ANNOUNCEMENT #91-4532 AND OPEN UTILITY MODEL ANNOUNCEMENT #96-13409 WHICH WERE APPLIED BY THIS APPLICANT AND WERE ANNOUNCED. AND ALSO THIS APPLICANT APPLIED FOR UTILITY MODEL OF A SAFETY SINGLE USE SYRINGE IN UTILITY MODEL APPLICATION #7783 IN 1999.

THIS DEVICE HAS MORE SIMPLE STRUCTURE AND EXACT FUNCTION THAN PRIOR SYRINGES WHICH WAS APPLIED BY THIS APPLICANT BEFORE.

THE SAFETY SYRINGES THAT THE NEEDLE SET IS FIXED TO THE PLUNGER, WITHDRAWN INTO THE INSIDE OF A BARREL AND KEPT IN IT AFTER INJECTION ARE SHOWN IN UTILITY MODEL ANNOUNCEMENT #91-4532, OPEN UTILITY MODEL #96-13409 AND UTILITY MODEL APPLICATION #7783, WHICH WERE APPLIED BY THIS APPLICANT AND ANNOUNCED.

THE PRIOR SINGLE USE SYRINGES WHICH WERE APPLIED FOR UTILITY MODEL BY THIS APPLICANT HAD A PROBLEM IN MANUFACTURING BECAUSE THOSE NEED A GREAT NUMBER OF PARTS AND HIGH PRECISION.
AS THIS DEVICE IS NEWLY DEVELOPED IN ORDER TO REMOVE THE DEMERITS, IT NEEDS FEW NUMBER OF PARTS, THE STRUCTURE IS SIMPLE, MANUFACTURING IS EASY AND THE POSSIBILITY OF THE INCORRECT OPERATION GETS REMOVED.

In the following it is referred to Fig. 12 to 25.

[STRUCTURE OF DEVICE]

SAME AS A GENERAL SYRINGE HAS A BARREL WHICH MEDICATION IS SUCKED INTO, A PISTON AND A PLUNGER IN THE INSIDE OF A BARREL.

THIS SAFETY SINGLE USE SYRINGE IS COMPOSED OF A BARREL(11), A NEEDLE(21), A PLUNGER(41) AND A NEEDLE INSERTING DEVICE(31) TO WHICH A NEEDLE(21) IS ATTACHED. A NUMBER OF PROJECTIONS(13) ARE IN THE INSIDE OF THE FRONT END OF AN INSERTING HOLE(12) OF THE ABOVE BARREL(11), AN ANNULAR STOP PROMINENCE(15) IS ON THE INNER CIRCUMFERENTIAL SURFACE OF A BARREL(11), AN ANNULAR RESTRAINING PROMINENCE(16) IS AT THE REAR END OF A BARREL, A NEEDLE LOCKING DEVICE(32) TO ATTACH A NEEDLE(21) IS AT THE CENTER OF A NEEDLE INSERTING DEVICE(31), A NUMBER OF "¬" SHAPED FEMALE GROOVES(34) HAVING THE WIDE ENTRANCES IN ORDER TO BE ASSEMBLED WITH A PROJECTION(13) LOCATED AT AN INNER SURFACE OF AN INSERTING HOLE(12) OF THE ABOVE CYLINDRICAL BARREL(11) ARE ON THE OUTER CYLINDRICAL SURFACE(33) OF A NEEDLE LOCKING DEVICE(32), A O-RING(35) IS INSERTED AT THE REAR OF THE GROOVES, A NUMBER OF FEMALE GROOVES(37) ARE IN THE INSIDE OF A NEEDLE INSERTING DEVICE(36), A

MALE EXTENSIONS(43) HAVING EACH RESTRAINING PROMINENCE(43') ARE AT THE FRONT END OF A PLUNGER(41) TO BE ASSEMBLED WITH A PISTON(42), AN EMPTY SPACE(47) IS AT THE FRONT END OF A PLUNGER(41) TO BE ASSEMBLED WITH A PISTON(42), A CUTTING NOTCH(45) IS AT THE FRONT PART OF A PLUNGER(41) IN ORDER TO BE EASILY BROKEN OFF, A ANNULAR STOP PROMINENCE(50) IS AT THE REAR PART OF A PLUNGER(41), REAR STOP PROJECTIONS(51) ARE AT THE LONGITUDINAL CENTER OF A PLUNGER, AN EMPTY SPACE(53) IS LONGITUDINALLY IN THE CENTRAL INSIDE OF A PLUNGER(41) BETWEEN REAR STOP PROJECTIONS(51) AND CUTTING NOTCH.

THE DEVICE HAVING THIS STRUCTURE OPERATES AS FOLLOWS.

A NEEDLE INSERTING DEVICE(31) IS INSERTED INTO A BARREL FROM THE BACK END OF A BARREL(11) AND PUSHED TOWARDS THE FRONT END UNTIL A NUMBER OF PROJECTIONS(13) IN THE INSIDE OF A INSERTING HOLE(12) OF A BARREL(11) REACHES THE END OF "¬" SHAPED GROOVE(34) HAVING A WIDE ENTRANCE ON THE CYLINDRICAL OUTER SURFACE(33) OF A NEEDLE INSERTING DEVICE(31), AND ASSEMBLED WITH A BARREL(11).

AND THEN A PLUNGER(41) ASSEMBLED WITH A PISTON(42) IS INSERTED INTO A BARREL FROM THE BACK END OF A BARREL(11) AND A NEEDLE(21) IS PUT INTO A NEEDLE INSERTING DEVICE(31) JUST BEFORE USING A SYRINGE. A PLUNGER(41) IS PULLED BACK AND MEDICATION IS SUCKED INTO THE INSIDE OF A BARREL(11) AS USUAL. MEDICATION IS INJECTED INTO A PATIENT'S BODY, A PLUNGER(41) BEING PUSHED.

WHEN AN NEEDLE INSERTING DEVICE(31) IS INSERTED INTO A BARREL(11) FROM THE BACK END OF A BARREL(11) AND FIXED TO A BARREL, A NEEDLE INSERTING DEVICE(31) IS PUSHED INTO A BARREL UNTIL A NUMBER OF PROJECTIONS(13) IN THE INSIDE OF AN INSERTING HOLE(12) OF A BARREL(11) REACHES THE END OF THE "¬" SHAPED GROOVE(34) HAVING THE WIDE ENTRANCE ON THE OUTER SURFACE OF A NEEDLE INSERTING DEVICE(31). IN THIS CASE A ANNULAR STOP PROMINENCE(15) ON THE INNER SURFACE OF A BARREL(11) MEETS THE BACK END OF A NEEDLE INSERTING DEVICE(31) AND AN O-RING(35) INSERTED INTO A NEEDLE INSERTING DEVICE(31) CLINGS TO THE INNER CYLINDRICAL SURFACE OF A BARREL(11) SO THAT SEALING IS COMPLETELY KEPT.

WHEN A NEEDLE INSERTING DEVICE(31) IS PUSHED INTO AN INSERTING HOLE(12) AT THE FRONT END OF A BARREL(11) AND LOCKED, THE PROJECTIONS(13) ON THE INNER CIRCUMFERENTIAL SURFACE OF A BARREL(11) IS POSITIONED AT THE BACK END(THE ENTRANCE OF THE GROOVE) OF THE "¬" SHAPED FEMALE GROOVE(34) HAVING THE WIDE ENTRANCE ON THE OUTER CIRCUMFERENTIAL SURFACE OF A NEEDLE INSERTING DEVICE(31). BUT WHEN A NEEDLE(21) IS PUT INTO A NEEDLE INSERTING DEVICE(31) AND LOCKED, THE MALE PROJECTIONS(13) IN THE INSIDE OF AN INSERTING HOLE(12) OF A BARREL(11) IS POSITIONED AT THE END OF "¬" SHAPED FEMALE GROOVE(34) BECAUSE BOTH THE NEEDLE(21) AND THE NEEDLE INSERTING DEVICE(31) IS ROTATED TOGETHER.

THUS, A NEEDLE INSERTING DEVICE(31) AND A NEEDLE (21) IS AT THE FRONT END OF A BARREL(11) AND A PLUNGER(41) IS INSERTED INTO A BARREL(11) SO THAT THE ASSEMBLY OF A SYRINGE IS FINISHED. THE PLUNGER(41) IS PULLED BACK, THE MEDICATION IS SUCKED INTO A BARREL AND IT IS INJECTED TO A PATIENT'S BODY. AFTER MEDICATION IS INJECTED TO A BODY AND A NEEDLE(21) IS WITHDRAWN FROM IT, AS ADDITIONAL FORCE IS APPLIED TO A PLUNGER(41) (FIGURE 5), A PISTON(42) WHICH HAS AN EMPTY SPACE(47) INSIDE IS PRESSED AND SQUEEZED. AT THE SAME TIME EACH RESTRAINING STOP PROJECTION(43') OF A LOCKING DEVICE(43) IS LOCKED IN THE INSIDE OF A FEMALE GROOVE(37) LOCATED AT THE OUTSIDE OF A CENTRAL HOLE OF A NEEDLE INSERTING DEVICE(31) SO THAT THE FRONT END OF A PLUNGER(41) IS CONNECTED WITH THE BACK END OF A NEEDLE INSERTING DEVICE(31). THEREAFTER, IF A PLUNGER IS ROTATED, A NEEDLE INSERTING DEVICE(31) IS ROTATED TOGETHER BY IT.

THUS A "¬" SHAPED FEMALE GROOVE(34) ON THE OUTER SURFACE OF A NEEDLE INSERTING DEVICE(31) ROTATED BY A PLUNGER(41) IS ROTATED TOGETHER SO THAT PROJECTIONS(13) ON THE INNER CIRCUMFERENTIAL SURFACE OF THE FRONT END OF A BARREL(11), WHICH ARE POSITIONED CIRCUMFERENTIALLY IN A "¬" SHAPED FEMALE GROOVE(34), ARE ROTATED UNTIL THE STRAIGHT LINE OF A "¬" SHAPED FEMALE GROOVE(34). AFTER THAT, WHEN A PLUNGER(41) IS PULLED BACK, PROJECTIONS(13) IS MOVED FORWARD THROUGH THE STRAIGHT LINE OF A "¬" SHAPED FEMALE, AND SIMULTANEOUSLY A NEEDLE INSERTING DEVICE(31) WITH AN ATTACHED NEEDLE(21) IS MOVED BACK INTO A BARREL(11) AND KEPT INSIDE.

A PLUNGER(41) IS MOVED BACKWARDS UNTIL AN PLUNGER ANNULAR PROMINENCE(50) REACHES AN RESTRAINING ANNULAR PROMINENCE(16) OF A BARREL. AND THEN, A PLUNGER IS BROKEN OFF AT A CUTTING NOTCH(45). THUS THE BROKEN PLUNGER(42) IS INSERTED INTO A BARREL FROM THE FRONT END OF A BARREL. IN OTHER WORDS, A REAR RESTRAINING STOP PROJECTION(51) OF A PLUNGER(41) IS INSERTED UNTIL IT REACHES THE INSIDE OF A PROJECTION(31) LOCATED IN THE INSIDE OF A FRONT INSERTING HOLE(12) OF A BARREL(11). A PLUNGER(41) WHICH IS LOCKED IN AN INSERTING HOLE(12) IS NOT PULLED BACK EASILY BECAUSE A REAR RESTRAINING STOP PROJECTIONS(51) IS ENGAGED WITH A PROJECTION(31) IN THE FRONT END OF A INSERTING HOLE.

CONSEQUENTLY, A NEEDLE INSERTING DEVICE(31) INCLUDING A NEEDLE(21) IS THROUGHLY INSERTED INTO THE INSIDE OF A BARREL(11). A NEEDLE STORED IN THE INSIDE OF A BARREL IS SAFELY KEPT IN BECAUSE A INSERTING HOLE(12) IS BLOCKED BY A BROKEN PLUNGER(41).

[EFFECT OF DEVICE]
THIS DEVICE CAN PREVENT A PRICKING OF DOCTOR, NURSE AND OTHER MEDICAL EMPLOYEE BECAUSE A NEEDLE USED FOR A PATIENT IS INSERTED INTO THE INSIDE OF A BARREL AND KEPT IN.

A SYRINGE HAVING A SHARP NEEDLE SHOULD BE TREATED WITH MUCH CARE, WHETHER IT IS USED OR NOT. ESPECIALLY, IN CASE OF A BLOOD-STAINED NEEDLE USED FOR A PATIENT, IT SHOULD BE TREATED MOST CAREFULLY.

THE DISEASES SUCH AS HEPATITIS, AIDS AND THE LIKE CAN BE TRANSMITTED THROUGH BLOOD. THEREFORE, A NEEDLE USED FOR SUCH A PATIENT SHOULD BE HANDLED WITH UTMOST CARE.

THIS DEVICE HAS AN ADVANTAGE THAT A NEEDLE IS SAFELY KEPT IN A BARREL BECAUSE A PLUNGER IS BROKEN OFF AFTER A NEEDLE OF A SYRINGE IS THROUGHLY INSERTED INTO A BARREL. A BROKEN-OFF PLUNGER IS INSERTED INTO A BARREL THROUGH AN INSERTING HOLE. AN INSERTING HOLE IS BLOCKED WITH A BROKEN PLUNGER SO THAT A NEEDLE CAN BE KEPT IN AND TREATED SAFELY.

THUS THIS IS A USEFUL DEVICE WHICH MAKES A USED SYRINGE NOT TO BE REUSED AND PREVENTS INFECTIOUS DISEASES FROM SPREADING.

THIS RELATES TO A DEVICE FOR PREVENTING THAT DISPOSABLE SYRINGE IS REUSED AND THAT DOCTORS, NURSES, MEDICAL EMPLOYEES OR OTHERS ARE PRICKED BY THE USED NEEDLE BY MEANS OF INSERTING IT INTO A BARREL AFTER INJECTION. THE NEEDLE IS ATTACHED TO THE FRONT OF A BARREL WITH A NEEDLE INSERTING DEVICE, AN INSERTING PART IS MADE ON MALE EXTENSIONS IN THE FRONT END OF THE PLUNGER WHICH IS INSERTED INTO A BARREL AND A CONNECTING PART IS MADE IN THE BACK END OF A NEEDLE INSERTING DEVICE. A MALE EXTENSION OF A PLUNGER IS ASSEMBLED WITH A NEEDLE LOCKING DEVICE AND A NEEDLE INSERTING DEVICE WHICH A NEEDLE IS ATTACHED TO IS INSERTED INTO A BARREL WHEN A PLUNGER IS PULLED BACK. A NEEDLE INSERTING DEVICE IS KEPT IN THE INSIDE OF A BARREL. THEREFORE, USER DOESN'T BE PRICKED BY THE USED NEEDLE. CONSEQUENTLY, THIS SAFETY SYRINGE CAN PREVENT INFECTIOUS DISEASES SUCH AS HEPATITIS AND AIDS FROM SPREADING.

Some important aspects of the safety syringe according to the second embodiment are as follows:

THIS SAFETY SINGLE USE SYRINGE IS COMPOSED OF A BARREL(11), A NEEDLE(21), A PLUNGER(41) AND A NEEDLE INSERTING DEVICE(31), SAME AS A GENERAL SYRINGE WHICH HAS A BARREL INTO WHICH THE LIQUID MEDICINE IS SUCKED, A PISTON AND A PLUNGER INSIDE THE BARREL, AND A NEEDLE IS PUT ON THE FRONT TIP OF THE BARREL.
THERE IS A NUMBER OF PROJECTIONS(13) IN THE INSIDE OF THE FRONT END OF AN INSERTING HOLE(12) OF THE ABOVE BARREL(11), THE CIRCULAR STOP PROMINENCE(15) AT THE INNER SURFACE OF A BARREL(11), A CIRCULAR RESTRAINING PROMINENCE(16) INSIDE THE REAR END OF A BARREL, A NEEDLE FIXING DEVICE(32) TO INSERT A NEEDLE(21) AT THE CENTER OF A NEEDLE INSERTING DEVICE(31), A NUMBER OF "¬" SHAPED GROOVES(34) WITH THE WIDE ENTRANCES AT AN OUTER SURFACE(33) OF A CYLINDRICAL PART OF A NEEDLE FIXING DEVICE(32) IN ORDER TO BE ASSEMBLED WITH A PROJECTION(13) LOCATED AT AN INNER SURFACE OF AN INSERTING HOLE(12) OF THE ABOVE CYLINDRICAL BARREL(11), A O-RING(35) IN THE REAR OF THE GROOVES, A NUMBER OF THE INSERTING GROOVES(37), A CONNECTING DEVICE(43) OF UPPER AND LOWER PART WITH RESTRAINING PROMINENCES(43') AT THE FRONT END OF A PLUNGER(41) TO BE ASSEMBLED WITH A PISTON(42), AN EMPTY PART(47) AT THE FRONT END OF A PLUNGER(41) TO BE ASSEMBLED WITH A PISTON(42), A CUTTING NOTCH(45) AT THE FRONT PART OF A PLUNGER(41) IN ORDER TO BE EASILY BROKEN OFF, A CIRCULAR STOP PROMINENCE(50) AT THE FRONT PART OF A PLUNGER(41) REACHING TO THE REAR OF A PISTON(42), A REAR STOP PROJECTION(51) AT THE LONGITUDINAL CENTER OF A PLUNGER, AN EMPTY PART LONGITUDINALLY FROM A REAR STOP PROJECTION(51) TO A CUTTING NOTCH(45) IN THE CENTRAL INSIDE OF A PLUNGER.

A relevant difference between the first and the second embodiment is as follows:

According to the first embodiment, the plunger (41) has a cap (49), which serves to close the front hole of the cylinder (11) after injection, i.e. after retraction of the needle (21) into the cylinder (cp. Fig. 10 and 11).

According to the second emboldiment, a part of the plunger (11) itself serves (after breaking the plunger) to close the front hole of the cylinder (11) after injection, i.e. after retraction of the needle (21) into the cylinder. To close the front hole, the part of the plunger is inserted into the cylinder (cp. Fig. 16 and 18). Accordingly, the costs for the manufacturing of the cap (e.g. the cost for providing a mold) are saved.

Besides this difference, the general structure and functioning of the first and second embodiment are more or less the same.

In the above specification, the terms barrel and cylinder are used as synonyms. The needle inserting device or needle inserter (31) may as well be termed needle holder.

CLAIMS

1. Safety syringe, having a cylinder (11; 11), a syringe needle (21; 21), a needle holder (31; 31) associated to the cylinder and adapted to hold the syringe needle, and a plunger (41; 41) associated to the cylinder (11; 11), wherein the plunger (41; 41) comprises a piston (42; 42) and serves to inject a filling of the cylinder (11; 11) via the syringe needle (21; 21), and wherein the plunger (41; 41) can be coupled with the needle holder (31; 31) arranged in the region of a front hole (12; 12)) of the cylinder (11; 11), to retract the needle holder (31; 31) together with syringe needle (21; 21) into the cylinder (11; 11) by pulling the plunger (41; 41).

2. Syringe according to claim 1, characterized in that the plunger (41; 41) has a predeterminded breaking point, to allow, that a re-use of the syringe can be inhibited by breaking the plunger (41; 41).

3. Syringe according to claim 1 or 2, characterized in that the plunger (41; 41) carries a cap (49), which can be inserted in the front hole (12) of the cylinder (11) after retraction of the syringe needle (21) into the cylinder (11).

4. Syringe according to claim 2, characterized in that after breaking the plunger (41) a part of the plunger (41) can be inserted in the front hole (12) of the cylinder (11) after retraction of the syringe needle (21) into the cylinder (11).

5. Syringe according to one of the preceeding claims, characterized in that the plunger (41; 41) and the needle holder (21; 21) can be coupled by a snap-in connection (43, 43´, 37; 43, 43´, 37).

6. Syringe according to one of the preceeding claims, characterized in that the needle holder (21; 21) is fixed or fixable in the region of the front hole (12; 12) to the cylinder (11; 11) by a groove-projection-arrangement (13, 34; 13, 34).

7. Syringe according to claim 6, characterized in that the groove-projection-arrangement (13, 34; 13, 34) is arranged such, that the needle holder (21; 21), which is fixed in the region of the front hole (12; 12) to the cylinder (11; 11), can be released for retraction into the cylinder (11; 11) by rotating the needle holder (21; 21) with respect to the cylinder (11; 11).

8. Syringe according to claim 7, characterized in that the coupling between the plunger (41; 41) and the needle holder (21; 21) is adapted, to effect a rotation of the needle holder (21; 21) with respect to the cylinder (11; 11) by rotating the plunger (41; 41) which is coupled with the needle holder (21; 21), with respect to the cylinder (11, 11).

9. Syringe according to one of the preceeding claims, characterized by at least one feature disclosed within the specification or/and the drawings.

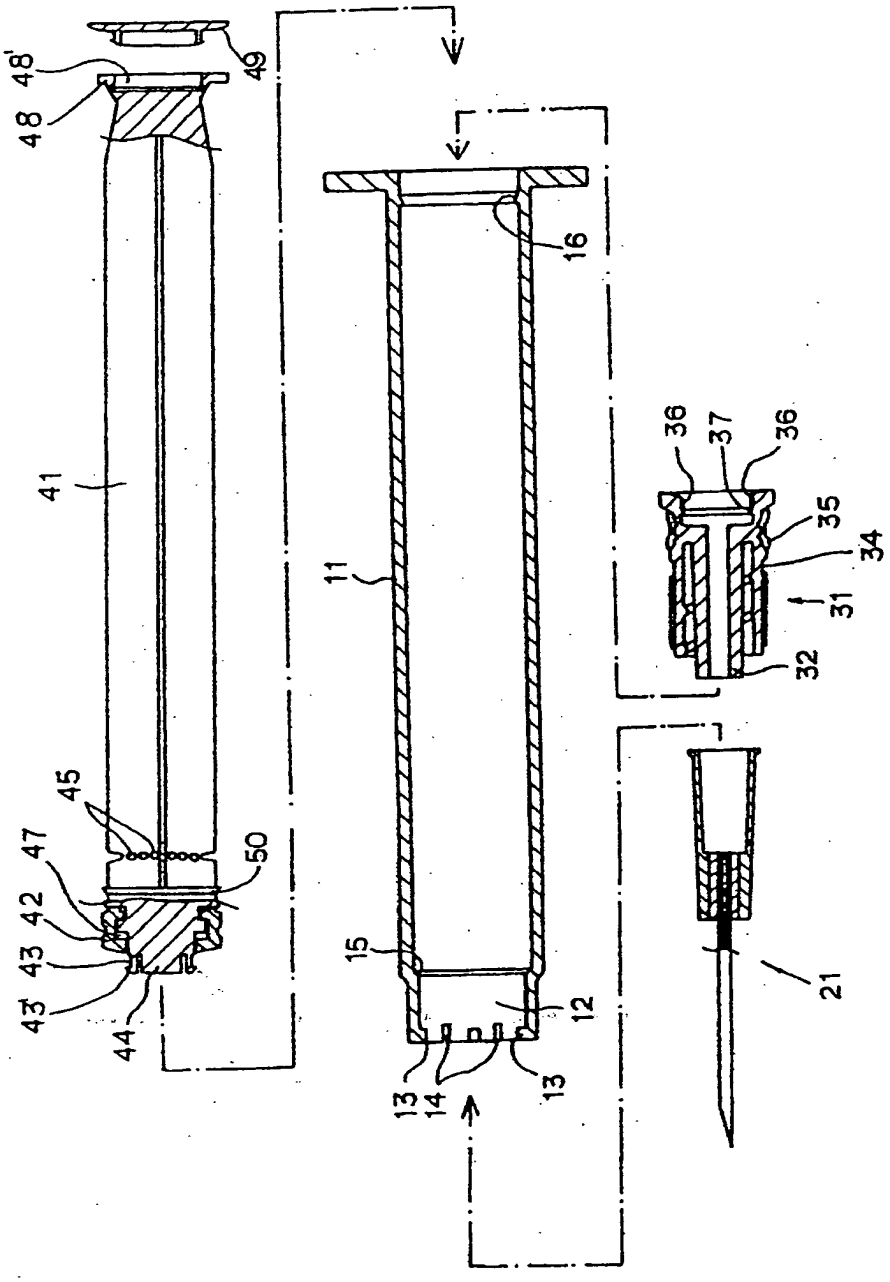

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Fig. 1

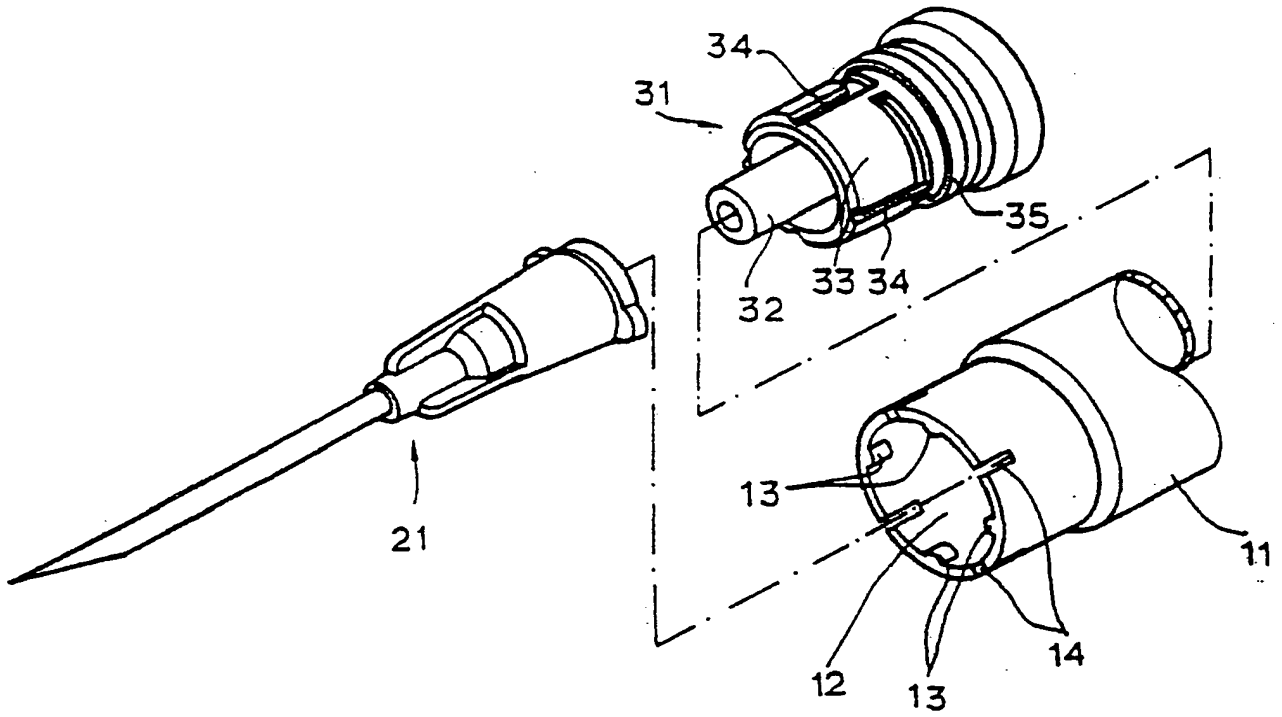


Fig. 2

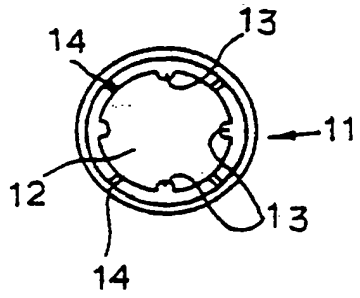
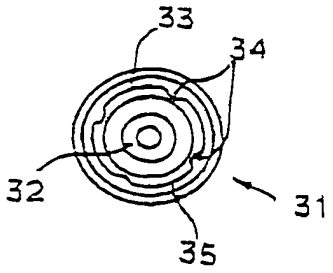


Fig. 3

Fig. 4



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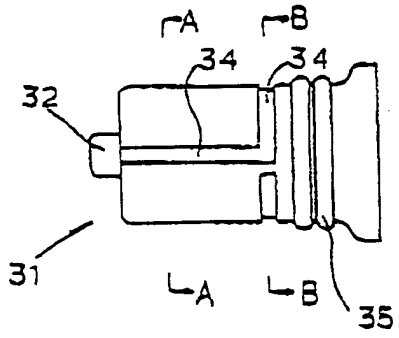

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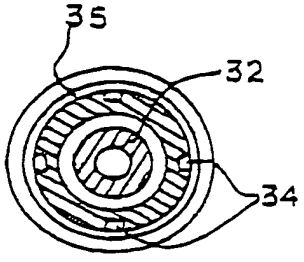

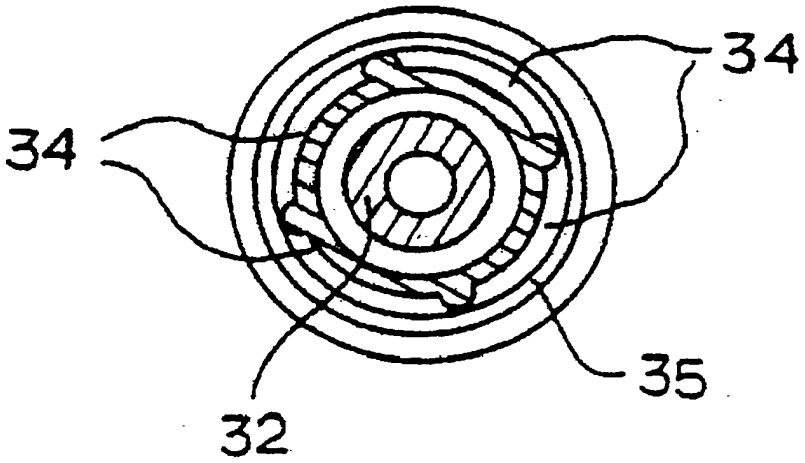

Fig. 7

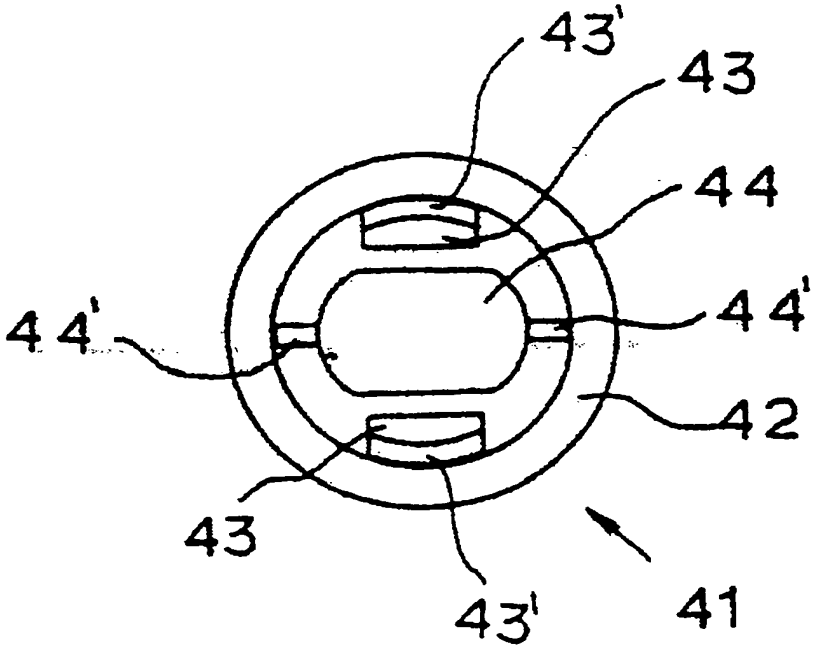

Fig. 8

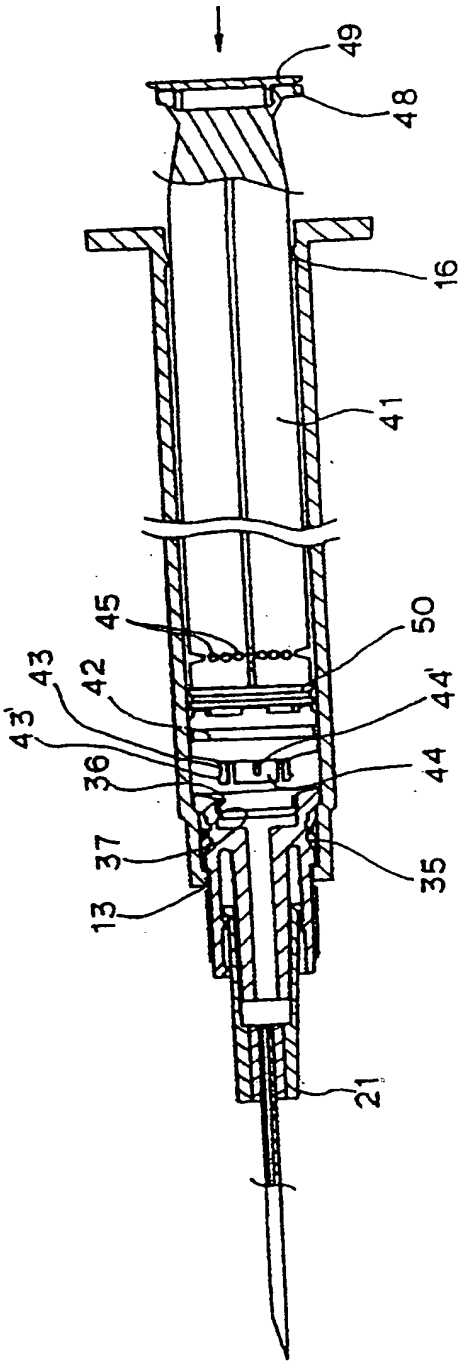
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Fig. 9

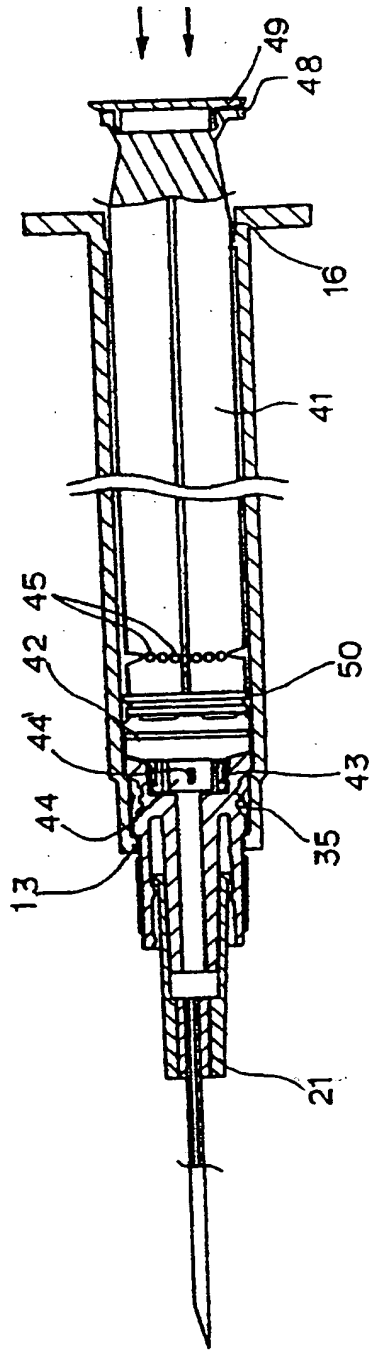
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Fig. 10

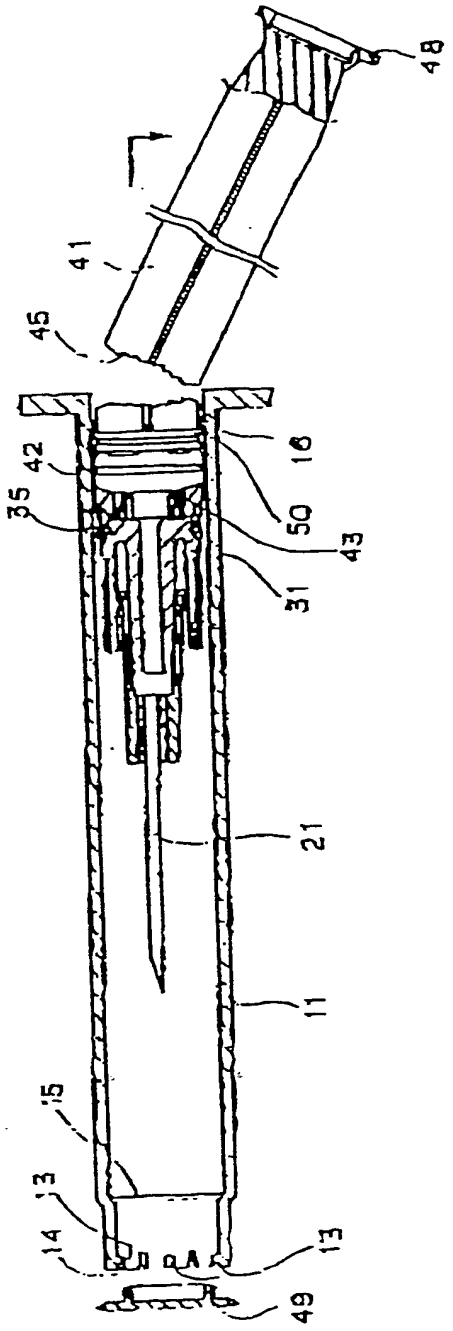

Fig. 11

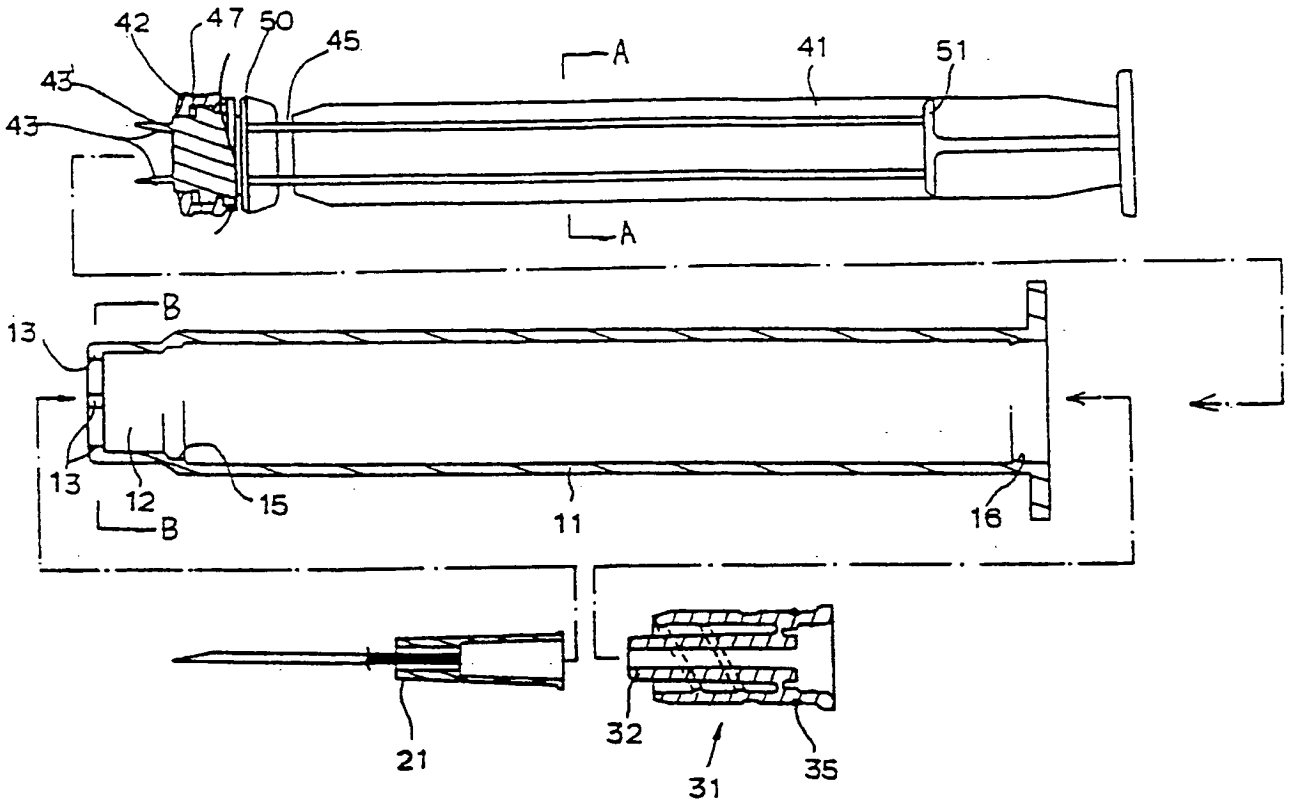
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Fig. 12

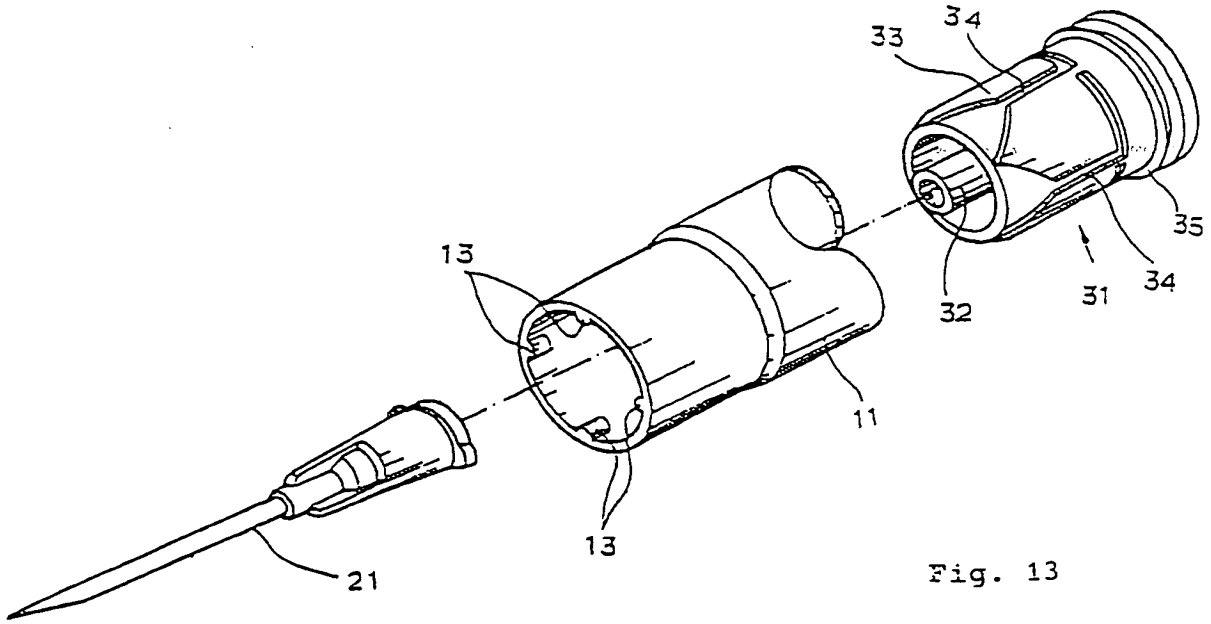
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Fig. 13

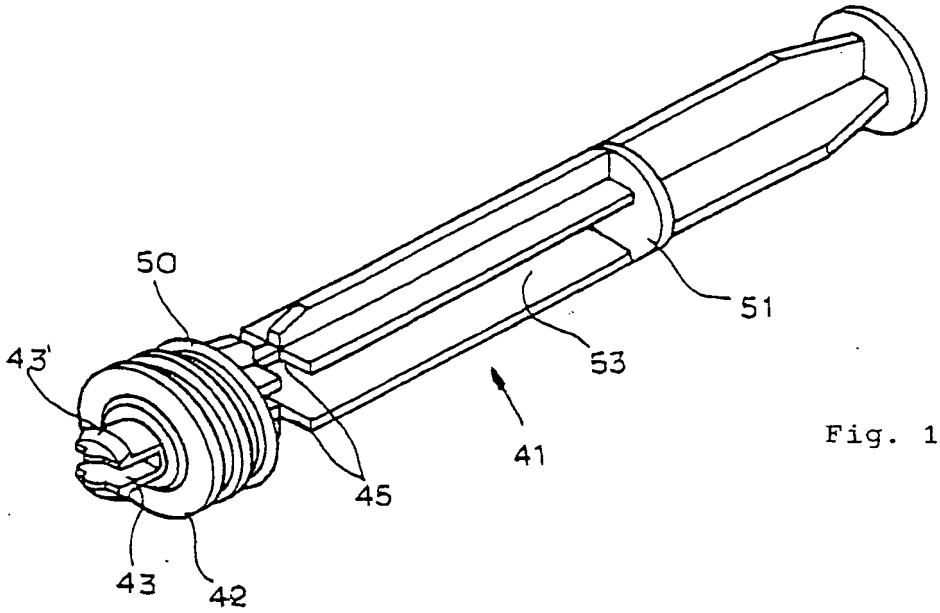

Fig. 14

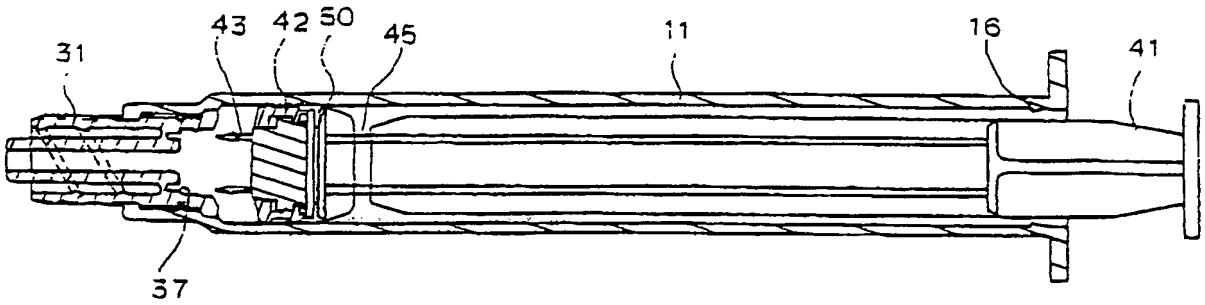

Fig. 15

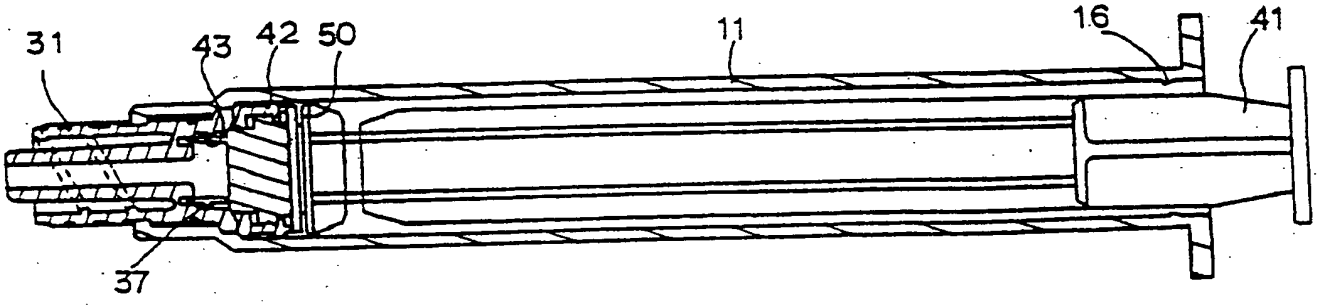

Fig. 16

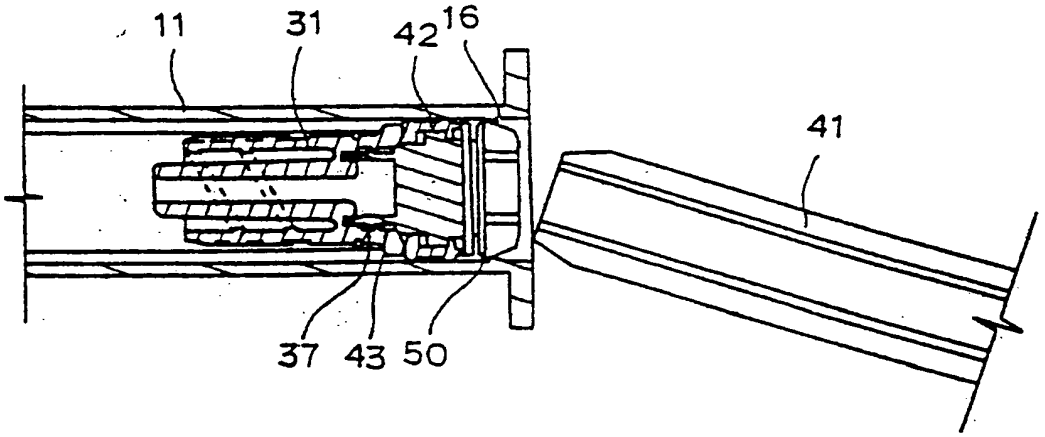

Fig. 17

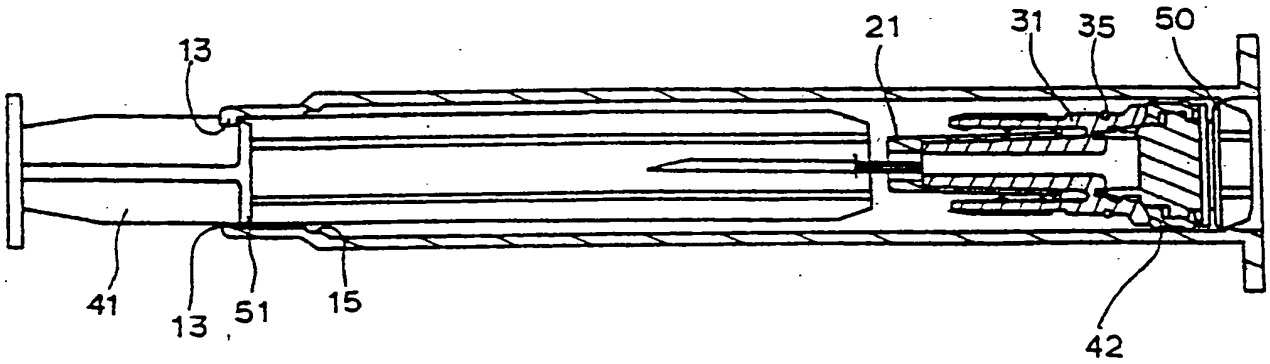

Fig. 18

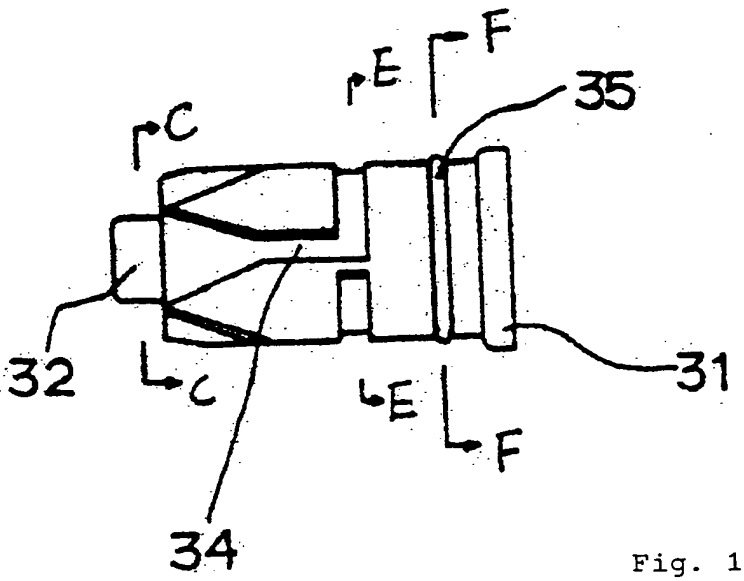

Fig. 19

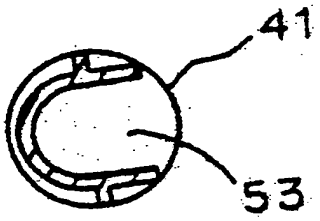

Fig. 20

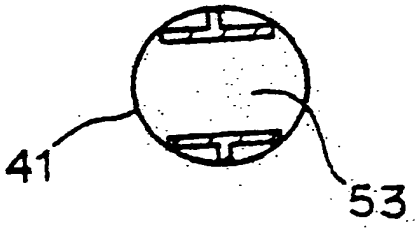

Fig. 21

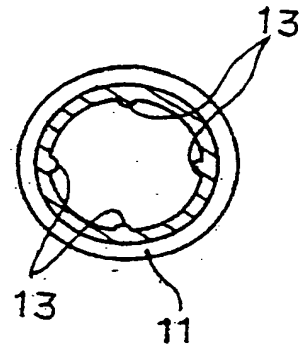

Fig. 22

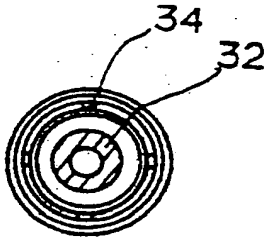

Fig. 23

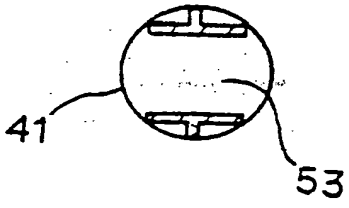

Fig. 24

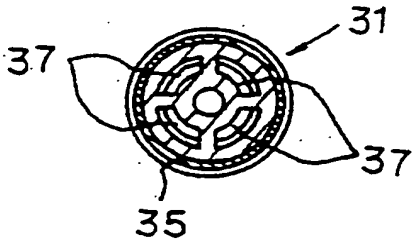

Fig. 25

INTERNATIONAL SEARCH REPORT

Intern ıal Application No
PCT/EP 00/07249

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61M5/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 618 075 A (ASSISTANCE PUBLIQUE ;CONSERVATOIRE NAL ARTS METIERS (FR)) 20 January 1989 (1989-01-20) figures 6-9 ---	1-9
X	EP 0 824 924 A (CHEN LONG HSIUNG) 25 February 1998 (1998-02-25) the whole document ---	1,2,4-6, 9
X	EP 0 278 493 A (HABLEY MEDICAL TECHNOLOGY CORP) 17 August 1988 (1988-08-17) the whole document ---	1,2,4-9
X	US 5 205 824 A (MAZUR MATTHEW S) 27 April 1993 (1993-04-27) the whole document ---	1,2,4-9
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search	Date of mailing of the international search report
4 December 2000	11/12/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Clarkson, P

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INTERNATIONAL SEARCH REPORT

Interr nal Application No
PCT/EP 00/07249

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 256 151 A (CHUL BANG Y) 26 October 1993 (1993-10-26) cited in the application the whole document _____	1-9

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INTERNATIONAL SEARCH REPORT

...ormation on patent family members

Interr nal Application No
PCT/EP 00/07249

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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(19) World Intellectual Property Organization
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(10) International Publication Number
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(22) International Filing Date: 27 July 2000 (27.07.2000)

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(30) Priority Data:
1999/15132 27 July 1999 (27.07.1999) KR

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(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **BANG, Young, Chul** [KR/KR]; #202, Sunneung Villa Ka-Dong, 140-32, Samsung-Dong, Kangnam-Ku, Seoul (KR).

(74) Agents: **WEICKMANN, H.** et al.; Kopernikusstrasse 9, D-81679 München (DE).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

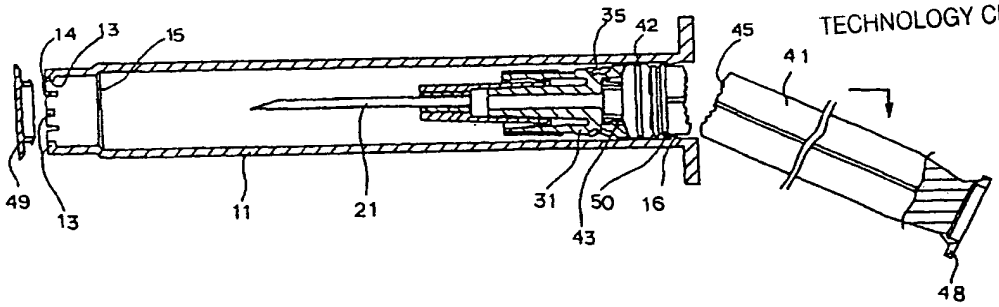
Published:
— *with international search report*

(48) Date of publication of this corrected version:
6 September 2002

(15) Information about Correction:
see PCT Gazette No. 36/2002 of 6 September 2002, Section II

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SAFETY SYRINGE



(57) Abstract: The invention provides a safety syringe, which has a cylinder (11), a syringe needle (21), a needle holder (31) associated to the cylinder and adapted to hold the syringe needle, and a plunger (41) associated to the cylinder (11), wherein the plunger (41) comprises a piston (42) and serves to inject a filling of the cylinder (11) via the syringe needle (21), and wherein the plunger (41) can be coupled with the needle holder (31) arranged in the region of a front hole (12) of the cylinder (11), to retract the needle holder (31) together with syringe needle (21) into the cylinder (11) by pulling the plunger (41).

WO 01/007106 A1

SAFETY SYRINGE

This invention relates to a safety syringe, which has a cylinder, a syringe needle, a needle holder associated to the cylinder and adapted to hold the syringe needle, and a plunger associated to the cylinder, wherein the plunger comprises a piston and serves to inject a filling of the cylinder via the syringe needle.

The invention provides a syringe having the features of claim 1. For particular high safety, the features of claim 2 are suggested. Advantages with respect to the safety are also obtained for the features of claim 3 or - alternatively - of claim 4. Substantial advantages are further obtained from the features of at least one of claims 5 to 8, which concern the coupling of the plunger with the needle holder and the fixation of the needle holder to the cylinder in the region of a front hole of the cylinder. Other possible features of a syringe according to the invention, which give further advantages, can be found in the following specification or/and in the figures.

A first embodiment, which serves to illustrate a syringe according to a first aspect of the invention, is shown in figures 1 to 11. The figures show:

Fig. 1;	Cross-sectional view of the parts.
Fig. 2;	Squint view of the parts.
Fig. 3;	Lateral view of the cylinder.
Fig. 4;	Lateral view of the syringe needle inserter.
Fig. 5;	Front view of the syringe needle inserter.
Fig. 6;	A-A line cross-sectional view of the Fig. 5.
Fig. 7;	B-B line cross-sectional view of the Fig. 5.
Fig. 8;	Front view of the plunger.
Fig. 9;	Cross-sectional view of this device when injection is completed.
Fig. 10;	Cross-sectional view of the device when plunger meets

the syringe needle fixer upon completion of injection.

Fig. 11; Cross-sectional view of this device which shows the breaking of the plunger after pulling the plunger back into the cylinder in order to keep the syringe needle and the syringe needle fixer inside the cylinder.

A second embodiment, which serves to illustrate a syringe according to a second aspect of the invention, is shown in figures 12 to 25. The figures show:

Figure 12; A partial longitudinal corss-section of the syringe.
Figure 13; An isometric exploded view of a needle inserting device.
Figure 14; A view of the plunger.
Figure 15; A longitudinal cross-section of the syringe without needle.
Figure 16; A longitudinal cross-section of the syringe without needle that the plunger is assembled with the needle needle inserting device.
Figure 17; A partial cross-section shows breaking off the plunger after injection.
Figure 18; A longitudinal cross-section of the syringe covered with a part. separated from the plunger
Figure 19; A longitudinal view of the needle inserting device.
Figure 20; A A-A line cross-section in Fig. 12.
Figure 21; A another A-A line cross-section in Fig. 12.
Figure 22; A B-B line cross-section in Fig. 12.
Figure 23; A C-C line cross-section in Fig. 19.
Figure 24; A E-E line cross-section in Fig. 19.
Figure 25; A F-F line cross-section in Fig. 19.

The first embodiment and/or the second embodiment serve to illustrate further aspects of the invention.

In the following, a safety syringe according to the first aspect and further aspects of the invention is explained.

This device is for a safety syringe preventing a third person from getting damaged by the used syringe needles. It is designed to keep the syringe needle in custody of syringe cylinder once used so that a third person may not be pricked by the used needles. The plunger shall then be broken after use in order to prevent from being used again.

In order to prevent repeated use of syringe needles by far, it is the current phenomenon that disposable syringes are predominantly being used. Such conventional disposable syringes have been technically designed to prevent to be reused.

The conventional disposable syringes are, however, after being used, usually or frequently being disposed or not properly dealt with the needles and thus a third person may be easily pricked. Such problems of giving damages to a third party have not been solved.

Because the syringe needles always have blood stain, in case medical workers including doctors and nurses as well as a third party get pricked by an used syringe needles they are very much concerned of being infected by the disease of the patients (AIDS, hepatitis, etc.) and such cases have been reported.

This device is a safety syringe system which prevents disease from being infected to a third party via used syringe needles by keeping it inside the syringe cylinder.

According to this device, the used needle does not need to be taken off from the syringe after use, but, instead, it is pulled into the cylinder to be fixed and kept in custody inside cylinder. And by doing this, infections of disease to a

third party by getting pricked can be prevented.

My previous patent application of this nature regarding safety syringe system have been published on the Utility Model Announcement Korea Utility Model No.91-4532 and Open Utility Model Public News Korea Utility Model No.96-13409.

This device is to introduce more advanced safety syringe system which is simpler in structure and more reliable in affect compared with the above-said previous patent.

Technical Target that this device pursue to accomplish.

My previous safety syringe system published on the Utility Model Announcement No.91-4532 and Open Utility Model Public News No.96-13409 was to have the needleset fixed to the plunger so that the syringe needle can be kept inside cylinder when the plunger is pulled back.

This disposable syringe that I have patented as above had some defects requiring a host of parts and extreme preciseness whereby creating difficulties in manufacturing. This device has been developed instead. It is simpler in structure, easier in manufacturing, has eliminated the possibility of mis-use and requires less number of parts.

In the following it is referred to Fig. 1 to 11.

Structure and action of the device.

It has cylinder for injection. Inside the cylinder are piston and plunger. In a syringe Which the dead-end of the cylinder has a syringe needle usually affixed, cylinder (11), syringe needle (21), syringe needle inserter (31) and plunger (41) are the parts in structure. At the end of inserting hole of the

cylinder are a host of projection (13) and incised grooves arranged alternately. On the inner face of the cylinder are stopping sill (15) and obstacle (hooking?) sill at the rear end. At the center of the syringe needle inserter (31) is the syringe needle fixer (32). On the outer face (33) of barrel shaped syringe needle fixer (32) are number of " ¬ " shaped grooves (34) for projections (13) to enter. Packing (35) is placed in its rear. Inside of the rear-end are projections prominence (36) on the top and bottom. Inside both of the up/down projections aforesaid is formed the obstacle (hooking) inside ring stopper (37). On the tip of the plunger (41) where piston (42) is inserted are top/bottom connecting device (43) which have hooking sills (43'). On both sides of the central projection (44) are erected projections (44'). At the end of the plunger (41) where piston (42) is inserted forms a space (47). Pressing button (48) at the rear part of the plunger (41) has a inserting groove (48'). The inserting groove (48') is for the cap (49) to be inserted to cover the inserting hole (12) of the cylinder tip.

In order for the plunger (41) to be easily broken, in the fore part of the plunger (41) are many "V" shaped grooves or holes and at the rear part of the piston (42) of plunger (41) is formed a stopping ring sill (50).

This device with such structure will act as follows:

Cylinder (11) and the syringe needle inserter (31) are combined together by thrusting the needle inserter (31) from the rear end of the cylinder (11) to the inside of the cylinder until the projections (13) on the inner face of the cylinder (11) insert hole (12) meet and set in the " ¬ " shaped grooves formed on the outer face of the barrel shaped needle inserter (31).

Then the piston (42) inserted plunger (41) is pushed into the rear side of the cylinder (11). Right before the use of the syringe, syringe needle (21) is fixed in the syringe needle inserter (31) as usual. Injection is sucked into the cylinder (11) by pulling the plunger backward. Injection is done to the patient

by pushing the plunger (41).

At the time when the syringe needle inserter (31) is fixed to the cylinder (11) from the rear toward inner side, it has to be pushed until the projections (13) of inserting hole (12) of the cylinder set in toward the circumference direction of the "¬" shaped grooves of the syringe needle inserter (31). At this time, the incised grooves between projections (13) will help syringe needle inserter (31) entering into the cylinder (11) by making the cylinder (11) tip bursted open so that the needle inserter (31) can be easily set in.

The stopping sill (15) of the inner face of the cylinder (11) joints the rear tip of the syringe needle inserter (31). The packing (35) inserted in the syringe needle inserter (31) will closely adhere to the inner face of the cylinder (11).

When the syringe inserter (31) is inserted by force into the inserting hole (12) of the cylinder (11) tip in order to fix the syringe needle inserter (31) onto the cylinder's (11) tip, the projections (13) of the inner face of the cylinder (11) will be hooked on any of the "¬" shaped grooves (34) of the outer face of the syringe needle inserter (31), that is, on the groove of any location in circumference direction, but as the syringe needle inserter (31) turns accordingly when we turn and fix the syringe needle (21) in the syringe needle inserter (31), the projections (13) erected in the inserting hole (12) of the cylinder (11) will become to locate at the last of the "¬" shaped grooves as soon as the syringe needle is fixed in.

Moreover, as the meeting places of the "¬" shaped grooves are not flat but are "U" or "∧" shaped, the projections (13) of cylinder (11) cannot be located on the border between the "¬" shapes.

Like this, the syringe needle inserter (31) and syringe needle are fixed at the cylinder (11) tip, and by thrusting the plunger (41) into the cylinder (11), syringe assembly is completed. The syringe sucks the injection into the

cylinder (11) when the plunger (41) is pulled back. After plucking the needle (21) from the patient (Ref. Fig. 9) upon completion of injection, if we apply force to push the plunger (41) forward (Ref. Fig. 10), piston (42) is being pressed so as for its volume to become smaller by the space (47) formed inside of the piston (42), and at the same time, the respective hooking sills (43') of upper and lower connecting device (43) formed up and down the plunger (41) is inserted in the obstacle ring sill (37) of the inner face of the rear part syringe needle inserter (31), plunger (41) tip and the syringe needle inserter (31) rear part will be combined together when the plunger (41) is turned, the projection (44') erected both sides of the central projection (44) of the plunger tip will joint the up/down projections (36) of the rear inner face of the syringe needle inserter (31), and the truning plunge (41) will turn the syringe needle inserter (31).

The syringe needle inserter (31) which is truned by the plunger (41) is again turning the "¬" shaped grooves (34) , then the projections (13) of the cylinder (11) will turn the straight line of the "¬" shaped grooves (34). When the plunger is drawn back, the projections (13) will be pushed forward along the straight lines of "¬" shaped grooves, and at the same time, the needle inserter (31) as well as the syringe needle (21) which is inserted thereto will be pushed back to inside of cylinder (11).

Backtracking plunger (41) will retreat until the plunger ring sill (40) reaches the hooking sill (16), then plunger (41) is to be broken. Then all the operation comes to an end by trans-inserting the cap (49) which is inserted in the pressing hole (48) into the inserting hole (12) in front of the cylinder (11).

In the cap's (49) inserting hold is prepared a ring(circular) sill and because the ring sill of the cap (49) insert hole is to meet the projection (13) of the insert hole (12) of cylinder (11), the cap inserted in the insert hole (12) would not easily come out.

Effect of this device.

This device is designed to withhold the used syringe needle inside the cylinder, the main body of syringe, and whereby to prevent the possible damages which may happen to medical workers including doctors and nurses as well as a third party from being pricked by the used syringe needles.

The syringe needs to be dealt with utmost care regardless before of after use, due to the sharp-pointed needles. A special attention is required to be paid to the used ones because of the blood stain. Especially, because hepatitis and AIDS are infectious to a third party via blood stain, the syringes used for patients of such disease must be handled with special attention.

However, as described in this device, if we insert the used syringe needle into the cylinder and then break the plunger, the syringe needle will be located inside the cylinder. If we cover the cylinder with the cap prepared in the rear of the plunger, there is no possibility at all for the syringe needle inside the cylinder to be exposed out of the cylinder and can be kept safely in custody until further process. If we use this device, we cannot re-use the used syringes. Therefore, it is very useful device as it can prevent disease caused by the used syringe needles from being infectious to a third person.

This device is designed to keep the used syringe needle inside the cylinder prohibiting re-use of the used syringe needles in order to prevent possible damages for medical workers including doctors and nurses and a third party alike to be taken from being pricked by the used syringe needles. The syringe needle which is fixed in the syringe needle fixer is set at the tip of cylinder with the help of the syringe needle inserter.

Inserting part is composed at the projection of the tip of the plunger which is to be put in the cylinder. At the rear end of the syringe needle fixer is formed the assembling part. The projection of the plunger joints the syringe needle

fixer. When plunger is drawn back, syringe needle fixer with its needle fixed in will also be drawn back and kept inside the cylinder. Thus, damages by the used syringe needle can be prevented. This device is of the safety syringe which can prevent in infectious diseases such as hepatitis and AIDS.

Some important aspects of the safety syringe according to the first embodiment are as follows:

It has cylinder to suck in injection. Piston and plunger are in the cylinder while the ordinary syringe has the syringe needle affixed to the syringe, this device has the cylinder (11), syringe needle (21), syringe needle inserter (31) and plunger respectively as parts of its structure. At the insert hole (16) of the above said cylinder (11) tip are a host of projections (13) and incised grooves (14) arranged alternatively one after another. Cylinder's (11) inner face has stopping sill and hooking sill in the rear. At the center of the syringe needle inserter is a syringe needle fixer to fix syringe needle. Outer barrel shaped outer face of the syringe needle fixer has a number of "¬" shaped grooves for projections (13) formed on the inner face of the insert hole (12) to set in. Packing (35) is set in the rear. On the upper and lower part of the inner face of the rear part are projections (36). Inside the upper and lower projections (16) is hooking ring sill (37). At the plunger (41) tip where piston is inserted in are top and bottom joints connecting device which has hooking sill (43'). On both sides of the central projection (44) inside the top/bottom joint connecting device. Space (47) is formed at the plunger (41) tip where piston is inserted in. At the pressing/pushing button (48) of the rear end of the plunger (41) has the insert groove (48'). In the insert groove (48'), a cap (49) is supposed to be inserted to cover insert hole (12) of the cylinder tip.

In the following, a safety syringe according to the second aspect and further aspects of the invention is explained.

This device relates to a safety syringe so as to prevent a pricking of other

person by means of withdrawing a needle in the inside of a barrel keeping in it after injection and the reuse of a syringe by means of breaking off a plunger.

The prior single use syringe which a technical method is applied to in order to prevent the reuse of a used syringe was usual.

But there was the possibility of pricking by a used needle because the prior single use syringe is left or thrown away, holding the needle on the syringe. Thus the problem that other person might be damaged with the used needle couldn't be solved by the single use syringe.

That is, some blood is left on the needle after injection. In that case, if doctor, nurse, medical employee or other person was pricked by the used needle, they might be infected with the disease of the patient (such as AIDS, hepatitis and thelike) by it. The examples are actually reported.

This device relates to the safety syringe so as to prevent transmitting the infectious diseases through the used needle, withdrawing the used needle into the inside of a barrel and keeping it in a barrel without removal of the needle, after injection.

As a prior patent documents on a safety syringe, there is Utility Model Announcement #91-4532 and Open Utility Model Announcement #96-13409 which were applied by this applicant and were announced. And also this applicant applied for utility model of a safety single use syringe in Utility Model Application #7783 in 1999.

This device has more simple structure and exact function than prior syringes which was applied by this applicant before.

The safety syringes that the needle set is fixed to the plunger, withrawn into

the inside of a barrel and kept in it after injection are shown in Utility Model Announcement #91-4532, Open Utility Model #96-13409 and Utility Model Application #7783, which were applied by this applicant and announced.

The prior single use syringes which were applied for utility model by this applicant had a problem in manufacturing because those need a great number of parts and high precision as this device is newly developed in order to remove the demerits, it needs few number of parts, the structure is simple, manufacturing is easy and the possibility of the incorrect operation gets removed.

In the following it is referred to Fig. 12 to 25.

[Structure of device]

Same as a general syringe has a barrel which medication is sucked into, a piston and a plunger in the inside of a barrel.

This safety single use syringe is composed of a barrel (11), a needle (21), a plunger (41) and a needle inserting device (31) to which a needle (21) is attached. A number of projections (13) are in the inside of the front end of an inserting hole (12) of the above barrel (11), an annular stop prominence (15) is on the inner circumferential surface of a barrel (11), an annular restraining prominence (16) is at the rear end of a barrel, a needle locking device (32) to attach a needle (21) is at the center of a needle inserting device (31), a number of "¬" shaped female grooves (34) having the wide entrances in order to be assembled with a projection (13) located at an inner surface of an inserting hole (12) of the above cylindrical barrel (11) are on the outer cylindrical surface (33) of a needle locking device (32), a O-ring (35) is inserted at the rear of the grooves, a number of female grooves (37) are in the inside of a needle inserting device (36), a male extensions (43) having each restraining prominence (43') are at the front end of a plunger (41) to be

assembled with a piston (42), an empty space (47) is at the front end of a plunger (41) to be assembled with a piston (42), a cutting notch (45) is at the front part of a plunger (41) in order to be easily broken off, an annular stop prominence (50) is at the rear part of a plunger (41), rear stop projections (51) are at the longitudinal center of a plunger, an empty space (53) is longitudinally in the central inside of a plunger (41) between rear stop projections (51) and cutting notch.

The device having this structure operates as follows:

A needle inserting device (31) is inserted into a barrel from the back end of a barrel (11) and pushed towards the front end until a number of projections (18) in the inside of a inserting hole (12) of a barrel (11) reaches the end of "¬" shaped groove (34) having a wide entrance on the cylindrical outer surface (33) of a needle inserting device (31), and assembled with a barrel (11).

And then a plunger (41) assembled with a piston (42) is inserted into a barrel from the back end of a barrel (11) and a needle (21) is put into a needle inserting device (31) just before using a syringe. A plunger (41) is pulled back and medication is sucked into the inside of a barrel(11) as usual. Medication is injected into a patient's body, a plunger (41) being pushed.

When a needle inserting device (31) is inserted into a barrel (11) from the back end of a barrel (11) and fixed to a barrel, a needle inserting device (31) is pushed into a barrel until a number of projections (13) in the inside of an inserting hole (12) of a barrel (11) reaches the end of the "¬" shaped groove (34) having the wide entrance on the outer surface of needle inserting device (31). In this case an annular stop prominence (15) on the inner surface of a barrel (11) meets the back end of a needle inserting device (31) and an O-ring (35) inserted into a needle inserting device (31) clings to the inner cylindrical surface of a barrel (11) so that sealing is completely kept.

When a needle inserting device (31) is pushed into an inserting hole (12) at the front end of a barrel (11) and locked, the projections (13) on the inner circumferential surface of a barrel (11) is positioned at the back end (the entrance of the groove) of the "¬" shaped female groove (34) having the wide entrance on the outer circumferential surface of a needle inserting device (31). But when a needle (21) is put into a needle inserting device (31) and locked, the male projections (13) in the inside of an inserting hole (12) of a barrel (11) is positioned at the end of "¬" shaped female groove (34) because both the needle (21) and the needle inserting device 31 is rotated together.

Thus, a needle inserting device (31) and a needle (21) is at the front end of a barrel (11) and a plunger (41) is inserted into a barrel (11) so that the assembly of a syringe is finished. The plunger (41) is pulled back, the medication is sucked into a barrel and it is injected to a patient's body, after medication is injected to a body and a needle (21) is withdrawn from it, as additional force is applied to a plunger (41) (Figure 5), a piston (42) which has an empty space (47) inside is pressed and squeezed. At the same time each restraining stop projections (43') of a locking device (43) is locked in the inside of a female groove (37) located at the outside of a central hole of a needle inserting device (31) so that the front end of a plunger (41) is connected with the back end of a needle inserting device (31). Thereafter, if a plunger is rotated , a needle inserting device (31) is rotated together by it.

Thus a "¬" shaped female groove (34) on the outer surface of a needle inserting device (31) rotated by a plunger (41) is rotated together so that projections (13) on the inner circumferential surface of the front end of a barrel (11), which are positioned circumferentially in a "¬" shaped female groove (34), are rotated until the straight line of a "¬" shaped female groove (34), after that, when a plunger (41) is pulled back, projections (13) is moved forward through the straight line of a "¬" shaped female, and simultaneously a needle inserting device (31) with an attached needle (21) is moved back

into a barrel (11) and kept inside.

A plunger (41) is moved backwards until a plunger annular prominence (50) reaches a restraining annular prominence (16) of a barrel. And then, a plunger is broken off at a cutting notch (45). Thus the broken plunger (42) is inserted into a barrel from the front end of a barrel. In other words, a rear restraining stop projection (51) of a plunger (41) is inserted until it reaches the inside of a projection (31) located in the inside of a front inserting hole (12) of a barrell (11). A plunger (41) which is locked in an inserting hole (12) is not pulled back easily because a rear restraining stop projections (51) is engaged with a projection (31) in the front end of an inserting hole.

Consequently, a needle inserting device (31) including a needle (21) is throughly inserted into the inside of a barrel (11). A needle stored in the inside of a barrel is safely kept in because an inserting hole (12) is blocked by a broken plunger (41).

[Effect of device]

This device can prevent a pricking of doctor, nurse and other medical employee because a needle used for a patient is inserted into the inside of a barrel and kept in.

A syringe having a sharp needle should be treated with much care, whether it is used or not. Especially, in case of a blood-stained needle used for a patient, it should be treated most carefully.

The diseases such as hepatitis, AIDS and the like can be transmitted through blood. Therefore, a needle used for such a patient should be handled with utmost care.

This device has an advantage that a needle is safely kept in a barrel because

a plunger is broken off after a needle of a syringe is throughly inserted into a barrel. A broken-off plunger is inserted into a barrel through an inserting hole. An inserting hole is blocked with a broken plunger so that a needle can be kept in and treated safely.

Thus this is a useful device which makes a used syringe not to be reused and prevents infectious diseases from spreading.

This relates to a device for preventing that disposable syringe is reused and that doctors, nurses, medical employees or others are pricked by the used needle by means of inserting it into a barrel after injection. The needle is attached to the front of a barrel with a needle inserting device, an inserting part is made on male extensions in the front end of the plunger which is inserted into a barrel and a connecting part is made in the back end of a needle inserting device. A male extension of a plunger is assembled with a needle locking device and a needle inserting device which a needle is attached to is inserted into a barrel when a plunger is pulled back. A needle inserting device is kept in the inside of a barrel. Therefore, user doesn't be pricked by the used needle. Consequently, this safety syringe can prevent infectious diseases such as hepatitis and AIDS from spreading.

Some important aspects of the safety syringe according to the second embodiment are as follows:

This safety single use syringe is composed of a barrel (11), a needle (21), a plunger (41) and a needle inserting device (31), same as a general syringe which has a barrel into which the liquid medicine is sucked, a piston and a plunger inside the barrel, and a needle is put on the front tip of the barrel. There is a number of projections (13) in the inside of the front end of an inserting hole (12) of the above barrel (11), the circular stop prominence (15) at the inner surface of a barrel (11), a circular restraining prominence (16) inside the rear end of a barrel, a needle fixing device (32) to insert a needle

(21) at the center of a needle inserting device (31), a number of " ¬ " shaped grooves (34) with the wide entrances at an outer surface (33) of a cylindrical part of a needle fixing device (32) in order to be assembled with a projection (13) located at an inner surface of an inserting hole (12) of the above cylindrical barrel (11), an O-ring (35) in the rear of the grooves, a number of the inserting grooves (37), a connecting device (43) of upper and lower part with restraining prominences (43') at the front end of a plunger (41) to be assembled with a piston (42), an empty part (47) at the front end of a plunger (41) to be assembled with a piston (42), a cutting notch (45) at the front part of a plunger (41) in order to be easily broken off, a circular stop prominence (50) at the front part of a plunger (41) reaching to the rear of a piston (42), a rear stop projection (51) at the longitudinal center of a plunger, an empty part longitudinally from a rear stop projection (51) to a cutting notch (45) in the central inside of a plunger.

A relevant difference between the first and the second embodiment is as follows:

According to the first embodiment, the plunger (41) has a cap (49), which serves to close the front hole of the cylinder (11) after injection, i.e. after retraction of the needle (21) into the cylinder (cp. Fig. 10 and 11).

According to the second embodiment, a part of the plunger (11) itself serves (after breaking the plunger) to close the front hole of the cylinder (11) after injection, i.e. after retraction of the needle (21) into the cylinder. To close the front hole, the part of the plunger is inserted into the cylinder (cp. Fig. 16 and 18). Accordingly, the costs for the manufacturing of the cap (e.g. the cost for providing a mold) are saved.

Besides this difference, the general structure and functioning of the first and second embodiment are more or less the same.

In the above specification, the terms barrel and cylinder are used as synonyms. The needle inserting device or needle inserter (31) may as well be termed needle holder.

CLAIMS

1. Safety syringe, having a cylinder (11; 11), a syringe needle (21; 21), a needle holder (31; 31) associated to the cylinder and adapted to hold the syringe needle, and a plunger (41; 41) associated to the cylinder (11; 11), wherein the plunger (41; 41) comprises a piston (42; 42) and serves to inject a filling of the cylinder (11; 11) via the syringe needle (21; 21), and wherein the plunger (41; 41) can be coupled with the needle holder (31; 31) arranged in the region of a front hole (12; 12)) of the cylinder (11; 11), to retract the needle holder (31; 31) together with syringe needle (21; 21) into the cylinder (11; 11) by pulling the plunger (41; 41).

2. Syringe according to claim 1, characterized in that the plunger (41; 41) has a predeterminded breaking point, to allow, that a re-use of the syringe can be inhibited by breaking the plunger (41; 41).

3. Syringe according to claim 1 or 2, characterized in that the plunger (41; 41) carries a cap (49), which can be inserted in the front hole (12) of the cylinder (11) after retraction of the syringe needle (21) into the cylinder (11).

4. Syringe according to claim 2, characterized in that after breaking the plunger (41) a part of the plunger (41) can be inserted in the front hole (12) of the cylinder (11) after retraction of the syringe needle (21) into the cylinder (11).

5. Syringe according to one of the preceeding claims, characterized in that the plunger (41; 41) and the needle holder (21; 21) can be coupled by a snap-in connection (43, 43´, 37; 43, 43´, 37).

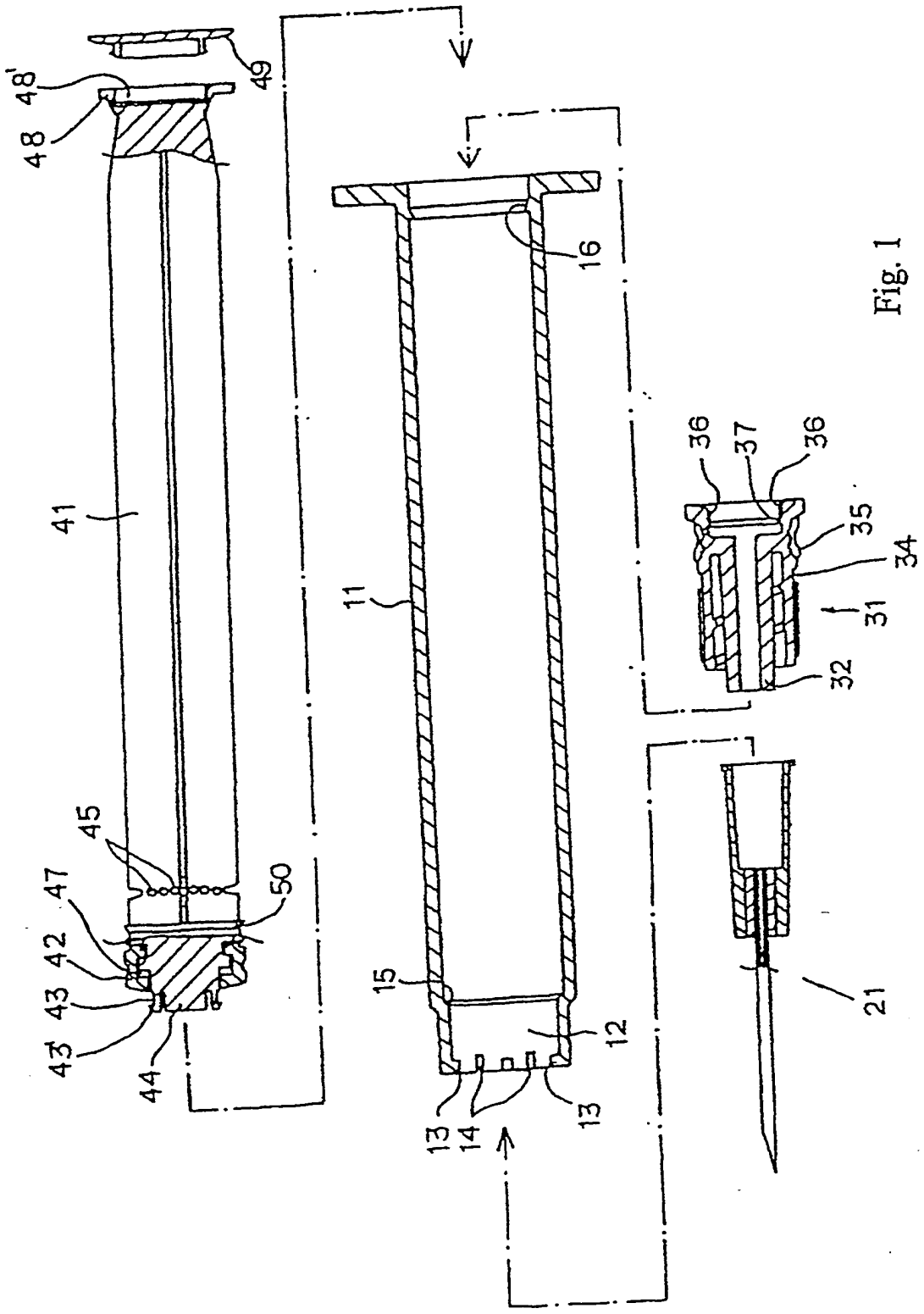

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Fig. 1

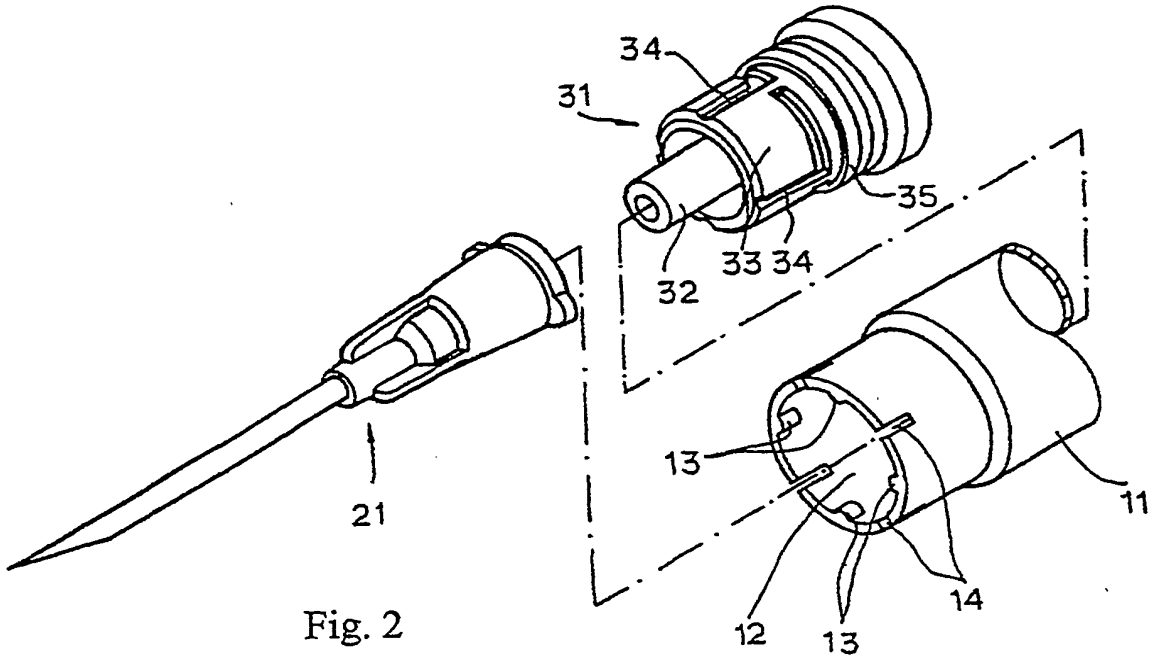

Fig. 2

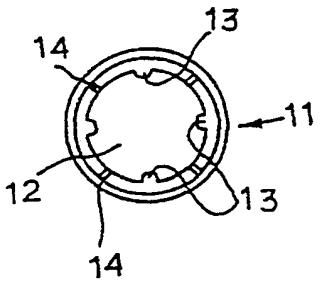

Fig. 3

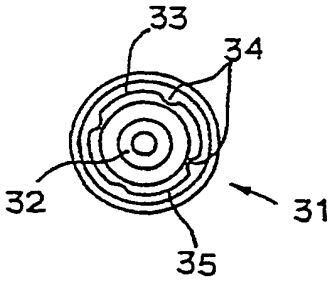

Fig. 4

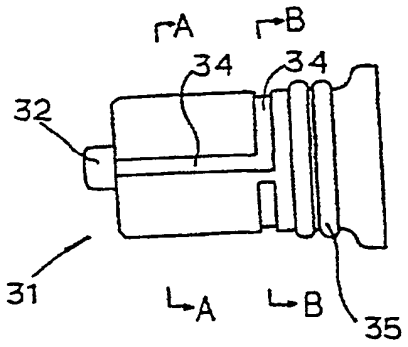

Fig. 5

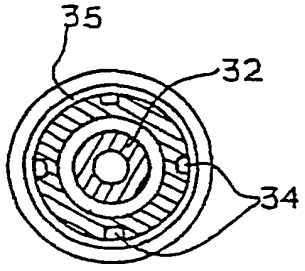

Fig. 6

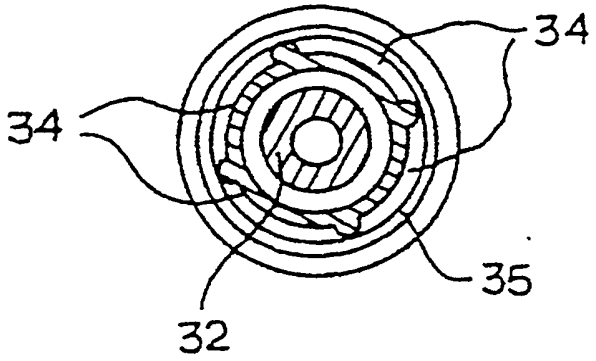

Fig. 7

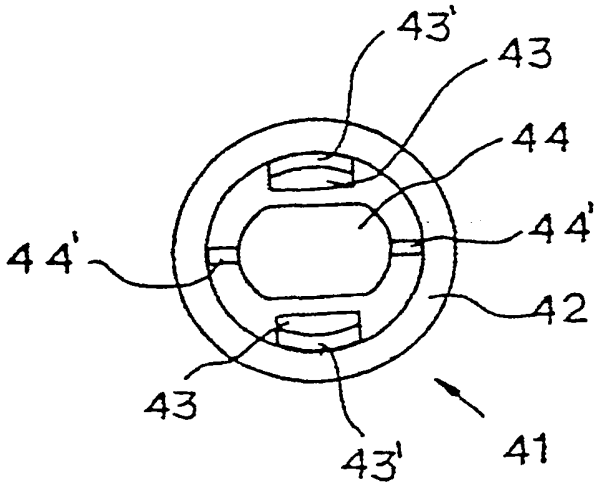

Fig. 8

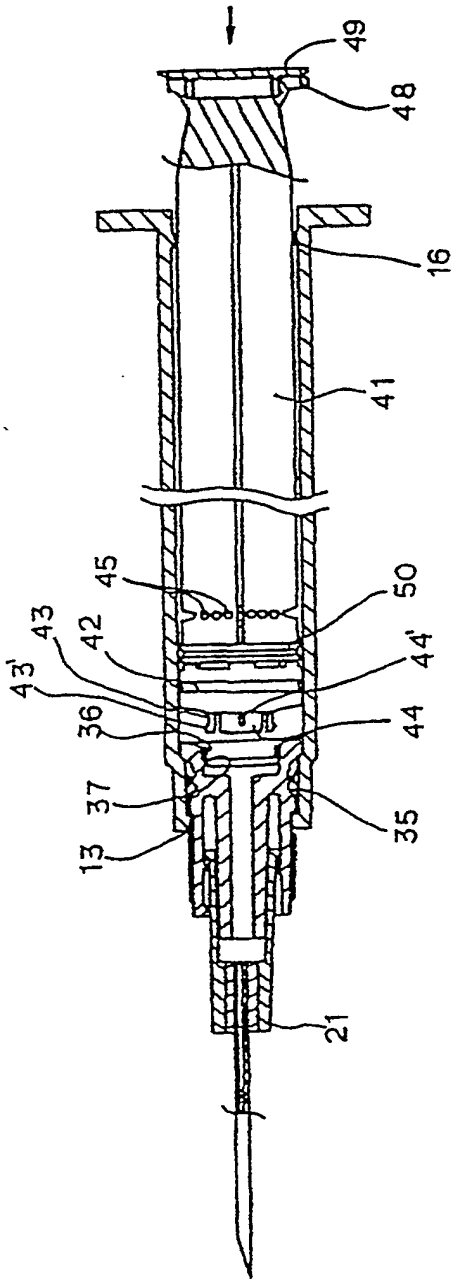
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Fig. 9

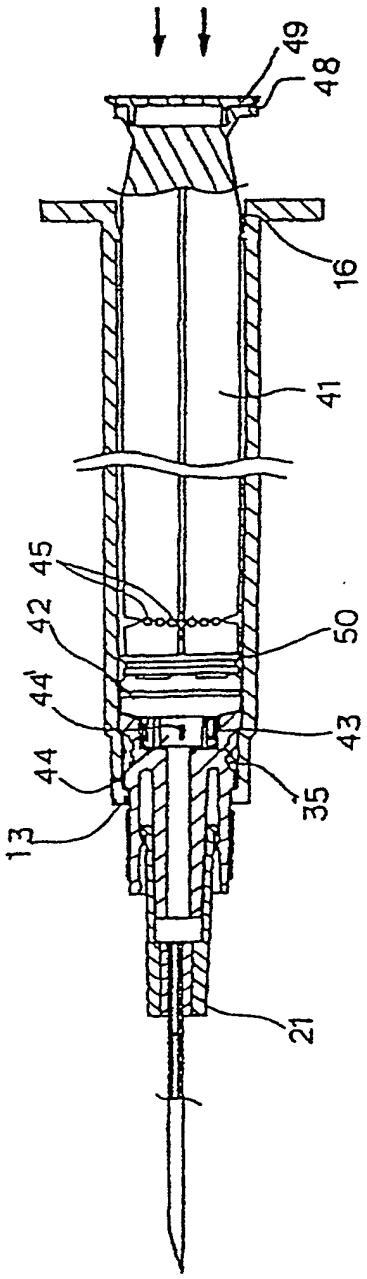
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Fig. 10

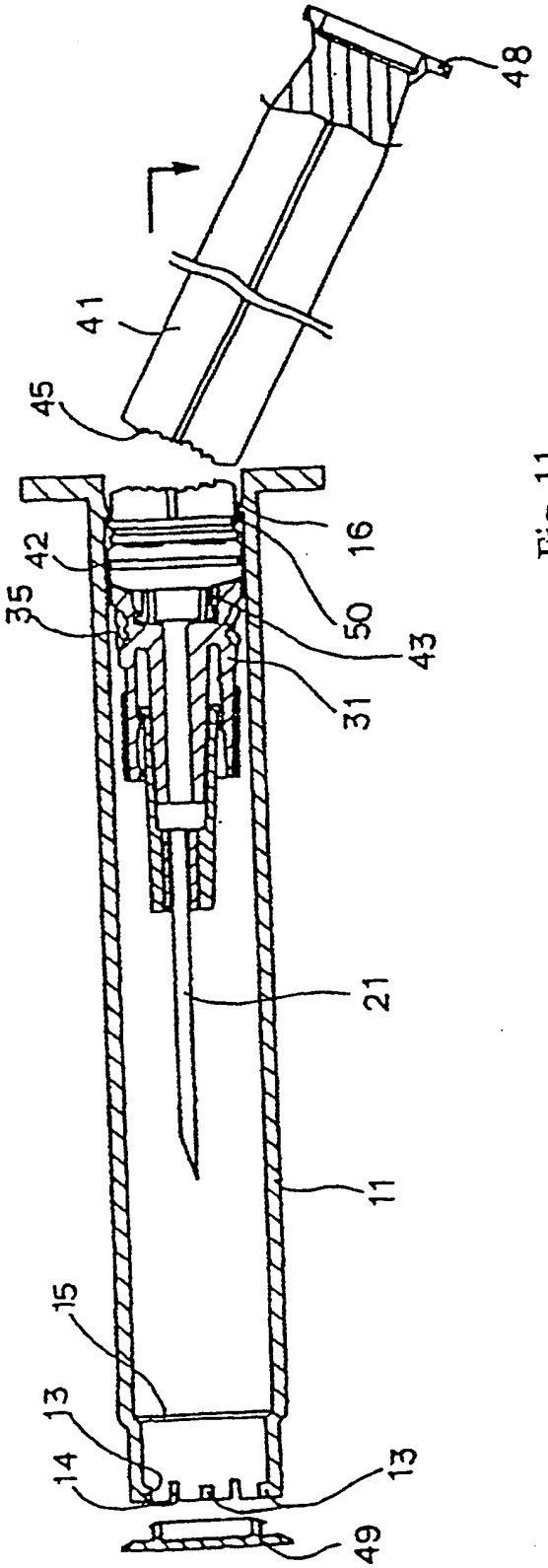

Fig. 11

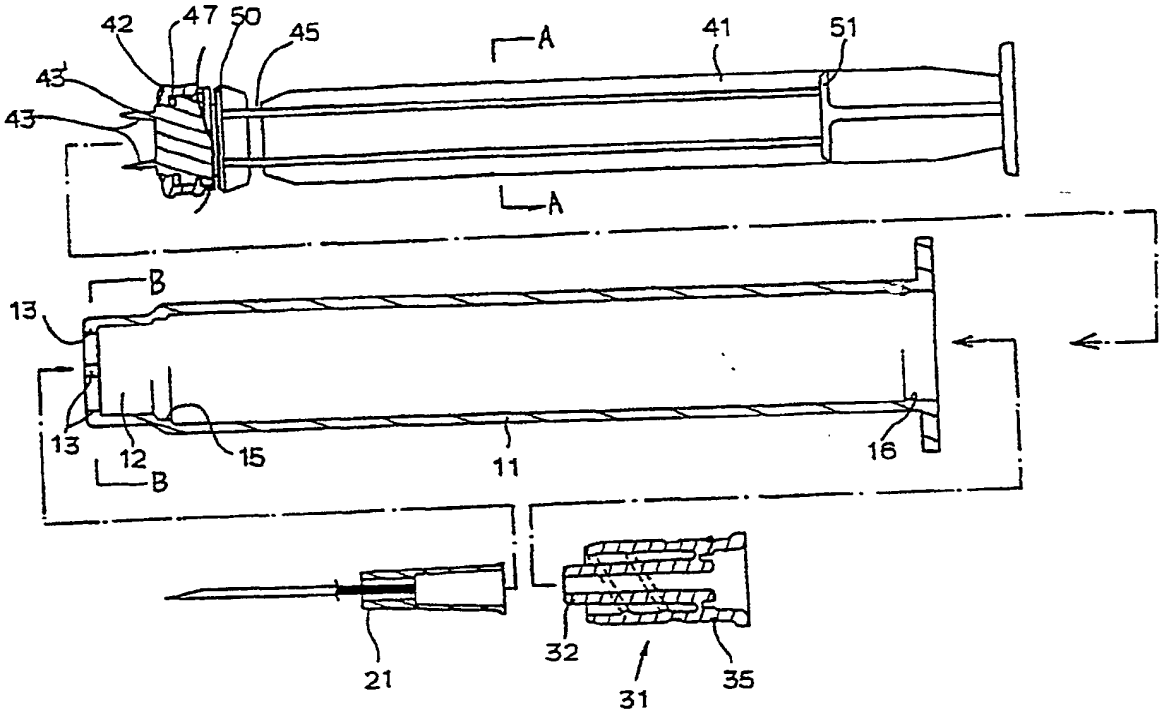
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Fig. 12

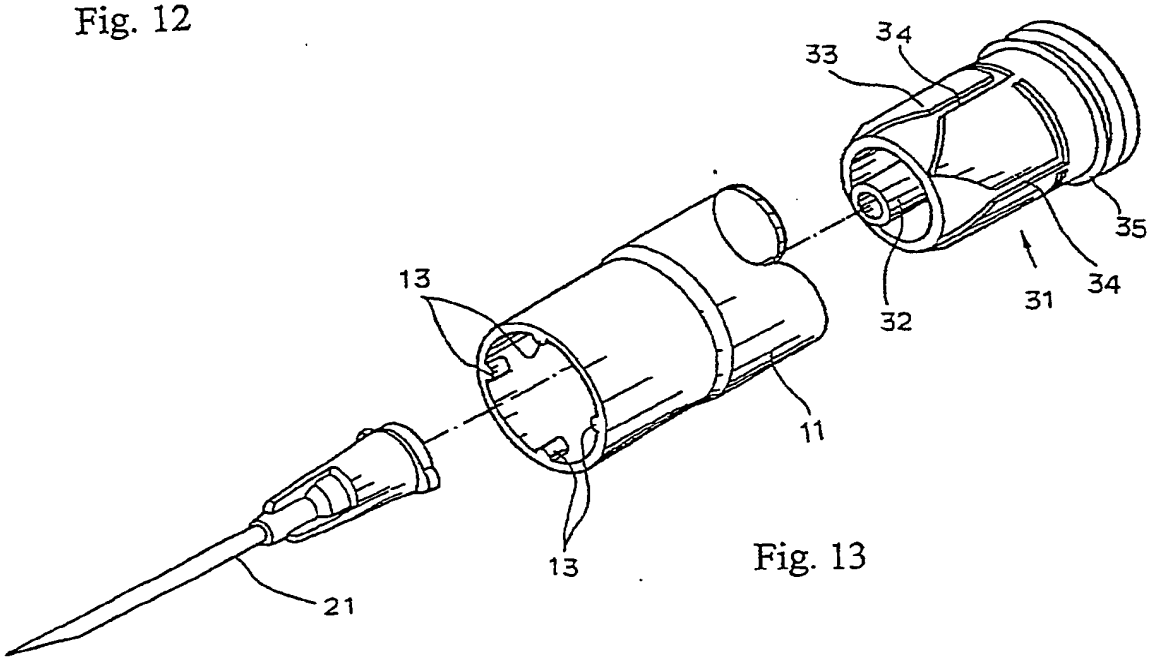
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Fig. 13

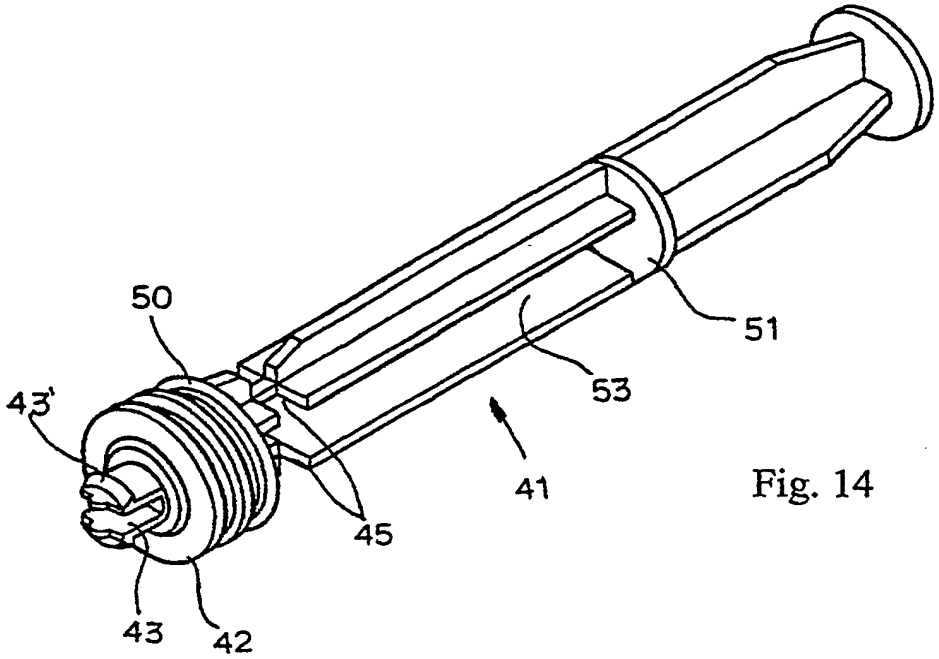

Fig. 14

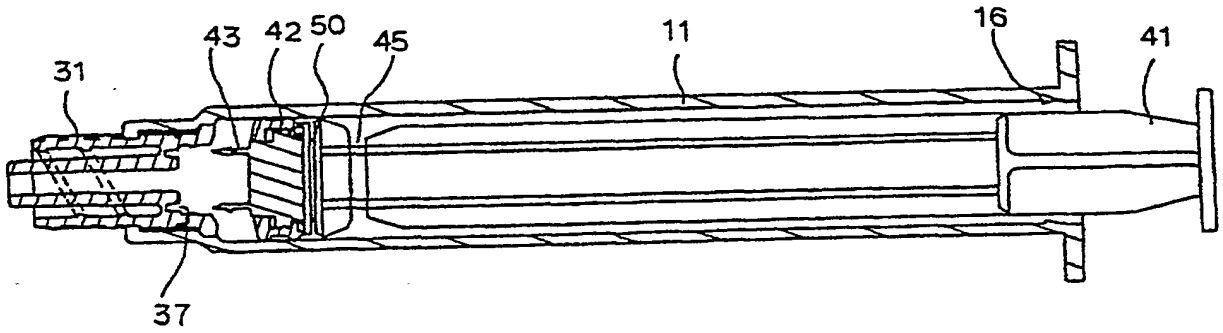

Fig. 15

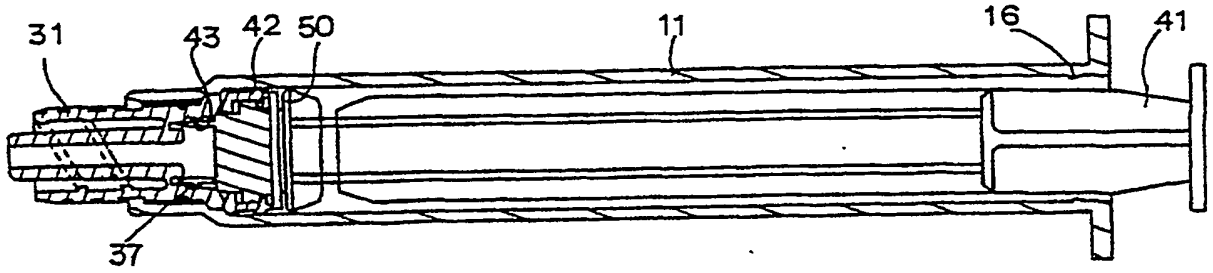

Fig. 16

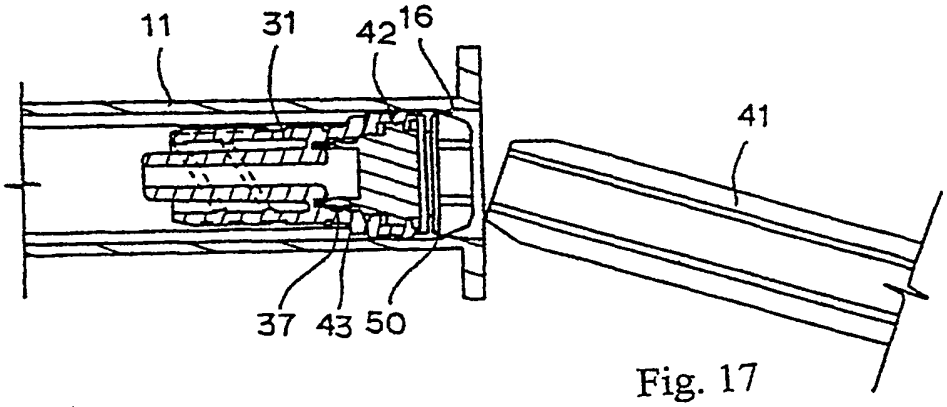

Fig. 17

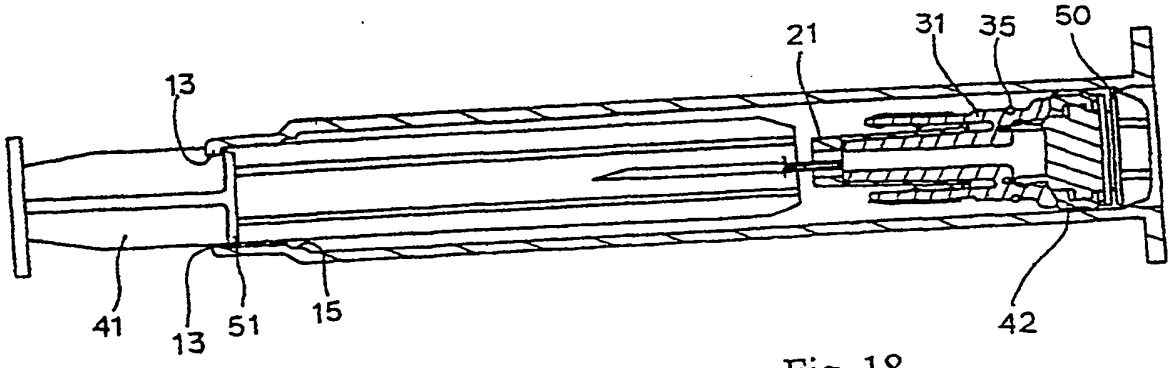

Fig. 18

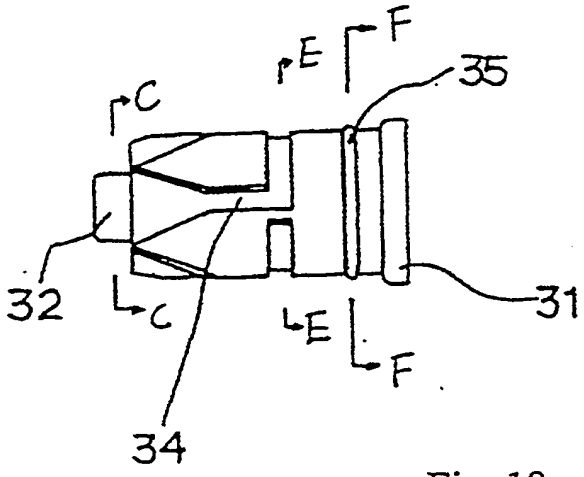

Fig. 19

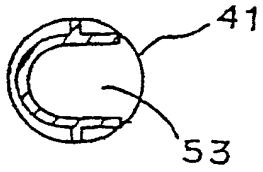

Fig. 20

Fig. 21

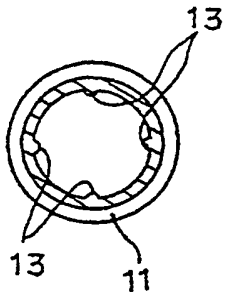

Fig. 22

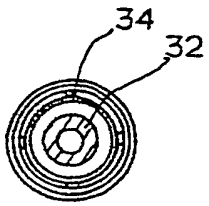

Fig. 23

Fig. 24

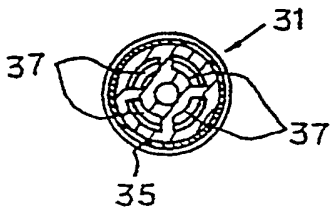

Fig. 25

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/07249

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61M5/32

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 618 075 A (ASSISTANCE PUBLIQUE ;CONSERVATOIRE NAL ARTS METIERS (FR)) 20 January 1989 (1989-01-20) figures 6-9 ---	1-9
X	EP 0 824 924 A (CHEN LONG HSIUNG) 25 February 1998 (1998-02-25) the whole document ---	1,2,4-6, 9
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X	US 5 205 824 A (MAZUR MATTHEW S) 27 April 1993 (1993-04-27) the whole document ---	1,2,4-9

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search	Date of mailing of the international search report
4 December 2000	11/12/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Clarkson, P

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INTERNATIONAL SEARCH REPORT

Interna[redacted]nal Application No
PCT/EP 00/07249

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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